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UNITED STATES-JAPANESE TRADE IN SEMICONDUCTORS

HEARING

BEFORE THE

SUBCOMMITTEE ON TRADE, PRODUCTIVITY, AND ECONOMIC GROWTH

OF THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

NINETY-NINTH CONGRESS

FIRST SESSION

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UNITED STATES-JAPANESE TRADE IN SEMICONDUCTORS

THURSDAY, OCTOBER 10, 1985

Congress of the United States,
Subcommittee on Trade, Productivity,
and Economic Growth of the
Joint Economic Committee,
Washington, DC.

The subcommittee met, pursuant to notice, at 10 a.m., in room SD-138, Dirksen Senate Office Building, Hon. Pete Wilson (member of the subcommittee) presiding.

Present: Senators Wilson and D'Amato.

Also present: John Starrels and Kenneth Brown, professional staff members; and Charles H. Bradford, assistant director.

OPENING STATEMENT OF SENATOR WILSON, PRESIDING

Senator Wilson. This hearing will come to order.

Good morning, ladies and gentlemen. Today, the Subcommittee on Trade, Productivity, and Growth of the Joint Economic Committee, continues its scrutiny of international trade in semiconductors. This is the second hearing which I have chaired, the first being that at the University of Santa Clara this past August.

Prior to the first hearing, the United States semiconductor industry had filed a formal complaint against the Japanese for unfairly restraining our exports to their markets—a so-called "301 petition." Micron Technologies decided to go it alone and file a separate dumping action against Japanese manufacturers of 64K D-RAM's—dynamic random access memory.

At the hearing in Santa Clara, a letter from the Department of Justice was released indicating that they had begun an antitrust investigation of Hitachi, a major Japanese chip manufacturer. That investigation is still underway.

In September, Micron filed an antitrust suit against 64K D-RAM manufacturers, while just 2 weeks ago Advanced Micro Devices, Intel, and National Semiconductor filed an antidumping case against Japanese manufacturers of EPROM's—erasable, programmable, read only memory.

All of these activities may be confusing to you. In fact, we will have a pop quiz at the end of this hearing to all in the audience to identify the plaintiffs and respondents in each of these actions.

Certainly, all of the suits, trade actions, and investigations of Japanese trade practices in semiconductors are at the very least indications of great turmoil in the semiconductor industry. More likely, they are evidences of a pattern of activities designed to take over an international market of great importance to the U.S. economy.

It is very much in the interest of the United States to support a system of free and open trade—as long as it is a system that enforces the rules that its participants have agreed to follow.

One senior executive in the United States electronics industry has told me that the Japanese do not protect their industries—except for those that are of strategic importance, those that are in the infant stage, and those that are struggling to compete and need a period of adjustment. This is not free trade.

There have recently been press reports that the horizon for the semiconductor industry is bright. This, despite continued short weeks and layoffs at our production plants. But even as the semiconductor industry emerges from this brutalizing downturn, it can only truly receive its just rewards if the U.S. Government undertakes its responsibility to ferret out and prosecute predatory business practices and illegitimate restraints on our exports. It will not be enough to see black ink in the semiconductor industry's quarterly earnings reports. Simply put, it is not adequate for the U.S. Government to rest when the semiconductor industry attains enough access to the international marketplace to turn a profit. There must be a removal of unfair and illegal obstacles that exist so that our industry has every access to the marketplace, not only to the marketplaces of our trading partners to whom we afford liberal access to our own, but there must be access to our own domestic marketplace and barriers to that that are presented by unfair trading practices must also be the target of our attention and our action. Only in this way can the U.S. semiconductor industry and other industries develop a secure financial foundation that will allow them to retain international leadership especially in the cutting edge, strategic field of high technology.

Before we begin taking testimony, I wish to note that Mr. Tsuneo Tanaka, president of Hitachi America, will not be appearing before the subcommittee today. We had hoped and indeed had expected that Mr. Tanaka would be present to provide documentation regarding Hitachi's semiconductor pricing policies. Such documentation could have served to substantiate Mr. Tanaka's so far unsubstantiated avowal of innocence on the charges of predatory pricing that followed the issuance of Hitachi's notorious "10 percent memo." That memo stated an intention to beat any competitor's price by at least 10 percent.

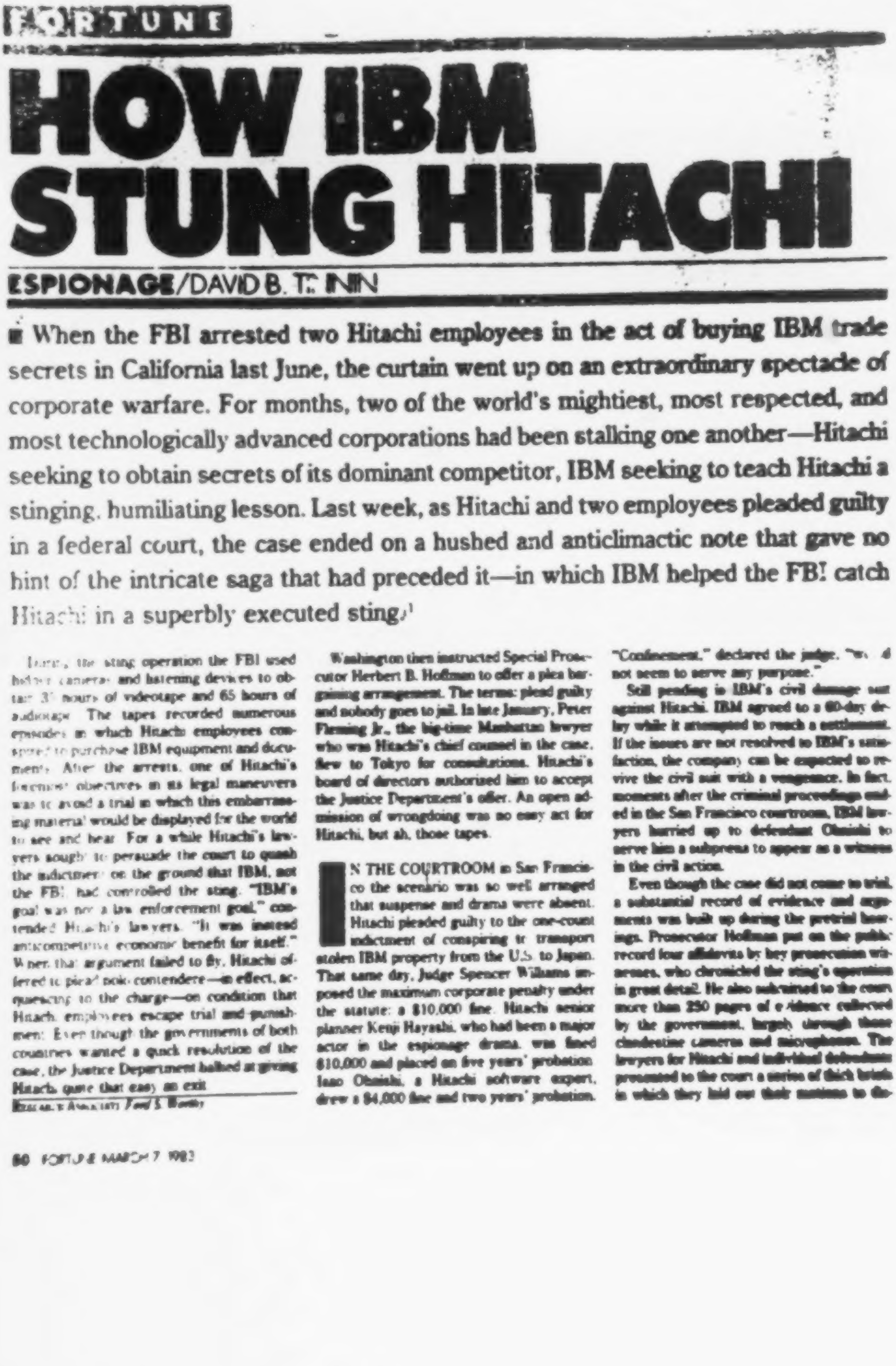
Mr. Tanaka's refusal to appear is particularly troublesome as Mr. Toshi Kitamura, executive managing director of Hitachi of Japan, the parent company of Hitachi America, personally assured me this past summer that his company would be glad to appear to make clear its innocence. Indeed, Mr. Kitamura specifically asked if I would excuse Hitachi from appearing at the August hearing in Santa Clara, requesting that I schedule a hearing in the fall in order to accommodate their schedule. We have done so. If Hitachi does have exculpatory documentation, it should be made available to this subcommittee. We continue to await it, but at this point we see merely a pattern of delaying tactics and certainly any intervening events should not have changed the exculpatory substance of Hitachi's documentation—if it, in fact, exists.

As the subcommittee does not have before it any documentation provided by Hitachi supporting its claims of fair and appropriate corporate conduct in its dealings in the United States, we cannot this morning examine such documentation. But I will submit for the record an article from the March 7, 1983, issue of Fortune magazine that treats Hitachi's activities in our country. It is an article entitled "How IBM Stung Hitachi." It chronicles Hitachi's theft of IBM trade secrets and its smuggling of those secrets back to Japan. Hitachi cannot assume that their pleas of innocence will satisfy the interests of this subcommittee. They are not here this morning, presumably on advice of counsel, because of the pending antitrust investigation by the Justice Department. We will await the outcome of that investigation. We will not prejudge it. Obviously, it would be unfair and improper for us to do so. That is not the role of this subcommittee nor the role of Congress.

But I will give a fair warning that when that investigation is concluded we will regard that our business has not been concluded and we will expect to see representatives of Hitachi at this subcommittee.

Let me further say that only 2½ years after it pleaded guilty in Federal Court in San Francisco to charges of industrial espionage, it would be wrong for Hitachi to assume that their plea of innocence without substantiation is going to satisfy this subcommittee. It will not.

[The article referred to by Senator Wilson follows:]



FORTUNE

HOW IBM STUNG HITACHI

ESPIONAGE/DAVID B. TINNIN

■ When the FBI arrested two Hitachi employees in the act of buying IBM trade secrets in California last June, the curtain went up on an extraordinary spectacle of corporate warfare. For months, two of the world's mightiest, most respected, and most technologically advanced corporations had been stalking one another—Hitachi seeking to obtain secrets of its dominant competitor, IBM seeking to teach Hitachi a stinging, humiliating lesson. Last week, as Hitachi and two employees pleaded guilty in a federal court, the case ended on a hushed and anticlimactic note that gave no hint of the intricate saga that had preceded it—in which IBM helped the FBI catch Hitachi in a superbly executed sting.[1]

During the sting operation the FBI used hidden cameras and listening devices to obtain 3[illegible] hours of videotape and 65 hours of audiotape. The tapes recorded numerous episodes in which Hitachi employees conspired to purchase IBM equipment and documents. After the arrests, one of Hitachi's foremost objectives in its legal maneuvers was to avoid a trial in which this embarrassing material would be displayed for the world to see and hear. For a while Hitachi's lawyers sought to persuade the court to quash the indictment on the ground that IBM, not the FBI, had controlled the sting. "IBM's goal was not a law enforcement goal," contended Hitachi's lawyers. "It was instead anticompetitive economic benefit for itself." When that argument failed to fly, Hitachi offered to plead nolo contendere—in effect, acquiescing to the charge—on condition that Hitachi employees escape trial and punishment. Even though the governments of both countries wanted a quick resolution of the case, the Justice Department balked at giving Hitachi quite that easy an exit.

Washington then instructed Special Prosecutor Herbert B. Hoffman to offer a plea bargaining arrangement. The terms: plead guilty and nobody goes to jail. In late January, Peter Fleming Jr., the big-time Manhattan lawyer who was Hitachi's chief counsel in the case, flew to Tokyo for consultations. Hitachi's board of directors authorized him to accept the Justice Department's offer. An open admission of wrongdoing was no easy act for Hitachi, but ah, those tapes.

IN THE COURTROOM in San Francisco the scenario was so well arranged that suspense and drama were absent. Hitachi pleaded guilty to the one-count indictment of conspiring to transport stolen IBM property from the U.S. to Japan. That same day, Judge Spencer Williams imposed the maximum corporate penalty under the statute: a $10,000 fine. Hitachi senior planner Kenji Hayashi, who had been a major actor in the espionage drama, was fined $10,000 and placed on five years' probation. Isao Ohnishi, a Hitachi software expert, drew a $4,000 fine and two years' probation. "Confinement," declared the judge, "would not seem to serve any purpose."

Still pending is IBM's civil damage suit against Hitachi. IBM agreed to a 60-day delay while it attempted to reach a settlement. If the issues are not resolved to IBM's satisfaction, the company can be expected to revive the civil suit with a vengeance. In fact, moments after the criminal proceedings ended in the San Francisco courtroom, IBM lawyers hurried up to defendant Ohnishi to serve him a subpoena to appear as a witness in the civil action.

Even though the case did not come to trial, a substantial record of evidence and arguments was built up during the pretrial hearings. Prosecutor Hoffman put on the public record four affidavits by key prosecution witnesses, who chronicled the sting's operation in great detail. He also submitted to the court more than 250 pages of evidence collected by the government, largely through those clandestine cameras and microphones. The lawyers for Hitachi and individual defendants presented to the court a series of thick briefs in which they laid out their motions to dis-

Research Associate *Fred S. Worthy*

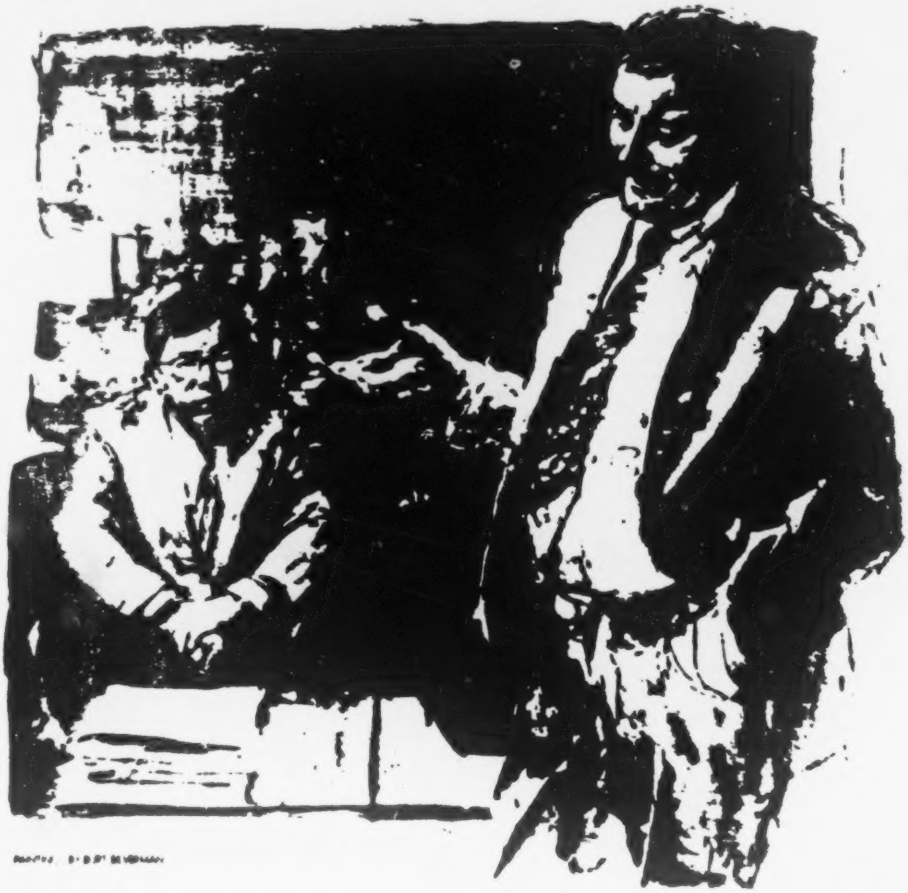
mine the case and indicated the line of argument they would take before a jury. After examining that material and doing some investigating of its own, FORTUNE knit together the story of how IBM stung Hitachi.

A minor player touched off the chain of events from which all the rest of the drama unfolded. He was Raymond Cadet, 45, a Haitian-born computer scientist, who on November 20, 1980, resigned from IBM's computer labs in Poughkeepsie, New York. The parting was amicable. During the routine exit interviews, according to IBM, Cadet signed a pledge that he was taking no confidential material with him. But in reality, says the Justice Department, Cadet took with him ten of the 27 volumes that made up the so-called Adirondack workbooks. Adirondack was IBM's code name for its top-secret program to build a new generation of computers, the 308X. The first model of that series, the 3081, was shipped in October 1981. The workbooks, which were three-ring binders, contained 40 to 200 pages. The first page of each volume carried a warning that the contents were proprietary material, not to be divulged except to fellow IBM employees on a need-to-know basis. Printed in red diagonally across each page were the words DO NOT REPRODUCE.

After he left IBM, Cadet went to work for a computer firm near Washington. Then, on June 1, 1981, an Iranian named Barry Saffaie recruited him for a job in Silicon Valley. Saffaie was a manager at a California company called National Advanced Systems, or NAS for short, which is a subsidiary of National Semiconductor. NAS marketed Hitachi products in the U.S. and manufactured computer products of its own as well.

In light of what happened afterward, it is easy to leap to the conclusion that Saffaie recruited Cadet to get those workbooks for Hitachi, but the evidence does not support the leap. Saffaie may not even have known that

The bait: *At a Tokyo hotel, consultant Paley tells Hitachi's Hayashi that it might be possible to find someone to obtain IBM secrets*



[illegible]

Cadet had the documents. The reason he wanted Cadet at NAS is clear enough: that outfit closely tracks IBM, and Cadet's relatively current knowledge made him valuable. Once Cadet joined NAS, though, Saffaie soon got hold of all ten volumes, and many photocopies were run off. After the FBI closed in on Hitachi, the Justice Department brought charges against Cadet and Saffaie, but a federal judge threw out the indictments because Justice refused to supply all the documents the defense demanded. The Justice Department has appealed.

DURING THE SUMMER of 1981, Barry Saffaie shuttled across the Pacific to brief Hitachi experts on computer developments in the U.S. In August, according to the Justice Department, he delivered copies of the ten workbooks to Hitachi computer specialists. At first, it seems, they did not realize what they were getting.

Meanwhile in San Jose, Hitachi was being offered a study of the 3081 by another source: Palyn Associates, a small consulting firm. Like NAS, Palyn keeps an eye on IBM. Palyn's president, Maxwell O. Paley, now in his mid-50s, spent 21 years at IBM and rose to chief of the Advanced Computing Systems laboratory before leaving the company in 1970. Palyn's brochure boasts that the top executives possess "80 years' cumulative IBM experience."

Paley founded Palyn Associates in 1972, and almost from the start Hitachi was a major client. Hitachi was always on the lookout for information about IBM. The Japanese firm is one of the so-called IBM-compatible manufacturers, which build computers so they can operate with the same software and peripheral equipment as IBM computers. The other major outfits now doing that are Amdahl Corp. and Fujitsu; the rest of the competition, such as Control Data, Burroughs, and NCR, make systems that operate mainly on their own software.

A company in the business of making IBM-compatible computers has to keep pace with IBM or perish. The earlier a competitor can discover the design directions of a new IBM product, the earlier it can rush into production with a similar machine, usually selling for less than the IBM original.

One way competitors copy IBM is by "reverse engineering." They purchase an early model, take it apart, and design something similar, with comparable capabilities. But that can be a slow process, allowing IBM months of market dominance. It's much more advantageous, obviously, to acquire IBM designs far in advance of the new computer's shipment date.

> The earlier a competitor can discover the design directions of a new IBM product, the earlier it can rush into production with a similar machine, usually selling for less.

And that, of course, was what made Paley and his fellow IBM veterans valuable to Hitachi. Using their own knowledge of IBM's techniques and design directions, Palyn Associates had compiled a study of the 3081, and the firm offered it to its regular contact man at Hitachi during one of his routine visits. He was Kenji Hayashi, a senior engineer in the computer project planning department. Hayashi took an index of the Palyn study back to Tokyo.

At that time, Hayashi knew nothing of Saffaie's delivery of the workbooks; he had never seen the man. But after he learned about the new material in Hitachi's possession, Hayashi sent Palyn Associates a telex, which the prosecution subsequently placed in the pretrial record. Hayashi wrote that his company was not interested in the Palyn study because, in his words, "we have already got Adirondack workbook that is similar to your covering [evidently meaning index]. But we have only Vol. 1, 3, 4, 8, 9, 10, 11, 12, 15, 22. If you have another Vol., let me know. We consider again. . . . Please keep confidential. Regards." As an IBM veteran, Max Paley immediately recognized the message for what it was: dynamite waiting to explode.

In Silicon Valley, where trade secrets are easily spirited from firm to firm in the heads or attaché cases of job-hopping engineers, confidential information often ends up in the wrong place. Such problems are frequently settled by a phone call from one company president to another and the return of the filched material. Some Silicon Valley veterans fault Paley for not having turned first to Hitachi, telling his client that the workbooks had been improperly appropriated and should be returned to IBM. Instead, after intense and agonized discussions with his top associates, Paley decided to tell IBM.

That must have been a wrenching decision. As a consultant, Paley owed something to his client. Moreover, Hitachi had been an important customer in dollar terms. Hitachi and other Japanese companies accounted for around 20% of annual billings.

Immediately after the Hitachi arrests, before he went silent on lawyer's orders, Paley attempted to justify his behavior on patriotic and moral grounds. The Hitachi people, he said, "weren't fighting fair." Other possible motives come to mind. In his years at IBM, Paley developed loyalties and close personal friendships, some of which he kept up after he moved to California. Also, his business depends to some extent on retaining links to IBM. And he may also have thought that, if he had to choose, IBM was potentially a more important client than Hitachi.

From whatever mixture of motives, Paley put in a call to a close friend at IBM, Bob O. Evans, vice president for engineering, programming, and technology. "Bob," said Paley, "I think one of my Japanese clients has gotten your crown jewels."

Paley's message set off a high-level alarm at IBM. For a company that spends substantially more than $50 million per year on security and prides itself on employee loyalty, the warning conjured up nightmarish possibilities. Was a traitor or perhaps even an inside ring selling IBM secrets?

ONLY A FEW top executives—no more than eight—were informed of the threat. The man in immediate command was assistant general counsel Donald Evangelista, a tall and robust cigar-chomper who oversees the highly sensitive areas of trade secrets and security. First off, Evangelista wanted to verify whether the Adirondack volumes in Hitachi's possession were genuine—they could have been a hoax contrived to extract money from Hitachi. For that mission he relied upon an agent whose performances in past emergencies inspired utmost confidence—Richard A. Callahan. A tall, white-haired, distinguished-looking man in his early 50s, Callahan is IBM's top troubleshooter for security matters. "If you see Callahan in your building," says one former IBM executive, "you know something big is going on."

A Marine captain during the Korean war, Callahan flies American and Corps flags at his home in Pebble Beach, California. He joined the FBI in his early 20s and had an outstanding career in federal law enforcement. He served in counterintelligence and later held supervisory posts in the Treasury's investigative branch and the Bureau of Narcotics and Dangerous Drugs before joining IBM as a full-time employee in 1973.

Callahan met with Paley in San Jose and offered him a retainer if he would cooperate with IBM in determining whether Hitachi really possessed those "crown jewels." Paley agreed to take on the assignment. The amount of the payment remains disputed. Fleming, the lawyer for Hitachi, says it was $200,000. IBM says that's wrong, but declines to reveal the correct figure.

Acting on Callahan's instructions, Max Pa-

The come-on: *An undercover FBI agent suggests to Hitachi's Jun Naruse [illegible] new disk drive. Naruse happily asks to be photographed hugging it*

ley telexed a reply to Hitachi's query on the Adirondack workbooks. Wrote Paley: "I made a contact and was told information you requested is under rather strict security control but can be obtained." He proposed a meeting in Japan in early October "for positive exchange of information, terms, conditions, etc." On the flight to Tokyo, Paley and a colleague, Robert Domenico, were accompanied by Callahan. The three checked into Tokyo's Imperial Hotel, but Callahan stayed out of sight and did his coaching from the sidelines.

On October 2, Paley and Domenico met with Hayashi in a room at the Imperial Hotel. Well prepared, Hayashi handed over a five-page handwritten set of questions about the operating systems of the new 3081. Then Paley produced attractive bait, prepared by Callahan: a handwritten index of the entire 27-volume set of workbooks. Paley told Hayashi that Paley Associates did not engage in acquiring confidential material, but that he might be able to find someone who did. According to Paley's affidavit, he asked to see the workbooks in Hitachi's possession so he could identify the genuine article after he returned to the U.S.

At a second meeting four days later, Hayashi handed over copies of three workbooks—volumes 6, 11, and 22, each still bearing the words "IBM CONFIDENTIAL." Hayashi, who said Hitachi wanted four of the volumes "very badly," returned the index Paley had given him. Alongside the listing for each volume he had placed a letter: A for the highest priority, B for the second, and C for a new copy of the books already in Hitachi's possession if an updated version had been re-

> Hayashi volunteered that Hitachi had a man in the U.S. with "IBM friends." He emphasized, however, that the company had a constant need for new "pipelines."

ture. Hayashi volunteered that Hitachi had a man in the U.S. with "IBM friends." He emphasized, however, that the company had a constant need for new "pipelines" to provide more information on IBM designs. Hayashi had one special request: an early peek at IBM's most advanced disk-drive memory mechanism before volume shipments to customers began. Paley said he would see what he could do.

Paley immediately turned over the workbooks and other material to Callahan, who had been briefed about the appearance and contents of the workbooks. He recognized at once that they were genuine.

Basically, IBM had two choices. It could start a civil suit that would seek to prohibit Hitachi from making use of the stolen data and ask for punitive damages. Or it could turn its findings over to the Justice Department and, in effect, start a criminal case. For IBM, the selection of the second, tougher course came naturally.

AS A MATTER of corporate conviction, IBM has no mercy on anyone, inside or outside, who steals its trade secrets—or tries. Once the company has solid grounds for suspecting a theft or an intentional patent violation, pursuit is relentless. It has pulled off some undercover sting operations of its own within the company. Last September IBM security men trapped three former employees peddling proprietary information about the company's new personal computer. What's more, IBM is not reticent about making such incidents known—it wants the message to be heard and heeded.

IBM was aware that the FBI had an undercover investigation under way in Silicon Valley. It was called Pengem, an acronym standing for Penetration of the Gray Electronics Market. One of the operation's objectives was to check the rapidly expanding flow of finished chips and sophisticated chip-production equipment to the Soviet Union and its allies. As a front for Pengem, the bureau rented an office in a two-story modern building in Santa Clara and established a realistic imitation of a consulting firm, called Glenmar Associates, staffed by FBI agents.

IBM had been involved with Pengem as far back as March 1981. The company's representative was none other than Richard Callahan. The IBM executive who authorized the company's participation was Evangelista. On August 27, 1981, Callahan had signed a three-page agreement in which IBM pledged to train no fewer than two and no more than seven FBI agents in "the area of purchasing procedures, terminology, and industry testing procedures . . . for both civilian and military usage." IBM also agreed to establish cover for two agents by providing credentials and identification badges and to verify their employment records just in case anyone tried to check them out.

When Callahan told the FBI of IBM's findings about Hitachi's misdeeds, Pengem's focus shifted from the Russians to the Japanese. The FBI agents in the San Jose office, however, thought the Hitachi case would require no more than two weeks or so to clear up, and they could then return to their original mission. Hence, they wanted to avoid letting Paley, a well-known figure in Silicon Valley, discover the true nature of Glenmar Associates and thus blow their cover.

To sidetrack Paley, Callahan arranged a hand-over operation. Under instructions from Callahan, Paley telephoned Hayashi, then staying at the New York Hilton, with the message that a meeting directly with the source of IBM information could be arranged in early November in Las Vegas. Hayashi agreed. The FBI took care of the rest, installing listening devices in a room at the Las Vegas Hilton.

With electronic ears eavesdropping, Paley introduced Callahan to Hayashi, identifying Callahan as a retired lawyer by the name of Richard Kerrigan who, as Paley put it, had "done work for me in the past." Paley then walked out of the room. Later that day, Alan Garretson, the FBI agent in charge of Glenmar Associates, entered the scene. Callahan presented him to Hayashi as Al Harrison, a source who might be able to acquire the desired IBM information.

That day and the next, Hayashi spelled out Hitachi's wish list of IBM equipment and documents. In accordance with the Justice Department's guidelines on undercover operations, Garretson told Hayashi that the material would have to be illegally taken and that the person involved could be "put in jail for stealing." Hayashi, however, failed to recognize the warning signal.

Originally the FBI had intended for Callahan to leave the case as soon as he introduced Garretson to Hayashi. But things did not work out that way. One reason was that the FBI wanted the assurance of continuing IBM involvement. For another, Callahan—as viewers of the tapes testify—is a superb actor. Older and more experienced than the FBI agents, he dominated the scenes.

After the Las Vegas meetings the first follow-up conversation with the Japanese was conducted by Callahan and the FBI's Garretson. On the line was a Hitachi memory-systems expert named Jun Naruse, who had been assigned to view IBM's new memory device. Naruse wanted assurances that all would go smoothly. According to affidavits, Naruse said that if there was any kind of trouble, "it's real trouble for Hitachi."

Three days later, Garretson met Naruse at 5 A.M. in the lobby of a hotel in Hartford, Connecticut. They drove to a parking lot near a Pratt & Whitney Aircraft plant, the jet engine division of United Technologies. In the parking lot, a Pratt & Whitney employee, whom the FBI had recruited for the mission, gave Garretson and Naruse identification badges that enabled them to gain admission to a high-security area in which one of the new memory devices was installed. In return for the badges, Garretson handed over an envelope apparently stuffed with money. "How much did you have to pay?" asked Naruse. "Plenty," whispered Garretson.

THE THREE MEN passed uneventfully through the checkpoint at the plant's entrance. As they reached the door of the room containing the memory device, they found it closed by a combination lock. While Garretson and Naruse hid in a closet, the Pratt & Whitney employee fetched a guard, who opened the door. Once inside, Naruse was ecstatic. Both men carried cameras and began taking pictures. Garretson repeatedly reminded Naruse not to include any background that could identify the location. After each had shot many pictures, Naruse asked to be photographed hugging the device.

Back in the Hartford hotel, Naruse gave Garretson $3,000 in $100 bills. Then, on November 18 in Santa Clara, he delivered an additional $7,000 in cash in return for maintenance manuals for the memory device.

As a good bug should, the Hartford embrace produced heightened enthusiasm within Hitachi. Through various channels, more and more requests for secret IBM data and equipment began reaching Glenmar Associates. Max Paley also got a letter, with the memory-jogging date December 7, 1981, in which Hayashi stressed the need for confidentiality and reminded him: "I have no idea to pay your travel fee if you don't have the suitable information for us." In a separate letter to Garretson, Hayashi set out an expanded shopping list: He placed a code and price tag alongside each item. Hitachi desired 13-14, for example, indicated the magnetic head and platters used to read and write data on the disk drive; for that Hitachi was willing to pay $10,000.

That letter crossed one from Callahan, in his role as lawyer Kerrigan. Callahan wrote to Hayashi that some IBM people were getting nervous about continuing to supply information. "As you well know, they risk disgrace and perhaps imprisonment if they are caught taking the IBM information you have been asking for. They are only willing to risk the consequences if the money rewards are great enough."

Hayashi quickly replied that "from the point of us, cost should depend on how we can use it. Except the rare case (D-14 head and media), our requesting information [he meant the information we are requesting] will be published in the future. Then timing is the best or most important as to decide the value." To make the point more graphic, Hayashi drew a chart that showed a sharply slanting line declining over a four-year period from a presumably high value to zero at the time of publication. He concluded by holding out the lure of a contract if Glenmar could obtain the complex microcode used to enhance the performance of one of IBM's older computers. "Our top management will understand your potential if you locate it by the end of January," Hayashi wrote.

WITH CALLAHAN'S help, Glenmar did better than that. On January 7, 1982, Garretson phoned Hayashi in Tokyo to report that he could deliver the microcode for $12,000. On January 18, at a meeting with Hayashi and Hitachi software expert Isao Ohnishi, Garretson was told that a secure money channel had now been established. Hitachi would send funds to Nissei Electronics Ltd., a Hitachi affiliate, which in turn would transfer the money to NCL Data Inc., where the president, Tom Yoshida, knows "how things are gotten" and would make the payments in bank transfers to Glenmar's account.

From then on, transactions occurred with almost dizzying rapidity. At most deliveries a Hitachi expert was present to check the goods and often to make on-the-spot requests for an additional manual or part. A camaraderie was also developing between the Japanese and their American suppliers. Viewers of the tapes say that much of the time was taken up by friendly banter about baseball and where the men were going to have dinner together that night.

All the while, the FBI was seeking to lure higher-ranking Hitachi executives within range of its clandestine cameras. The opening came in March when Hayashi said that his company was very interested in hiring IBM executives who were about to retire as consultants. Garretson insisted that the IBM executives in question were at such high levels they required personal assurances about the security of the arrangement from a Hitachi executive of equal rank. The ploy worked. On April 23, Callahan and Garretson met in San Francisco with Kisaburo Nakazawa, general manager of Hitachi's Kanagawa Works, which produces the company's mainframe computers. According to an

The sting: *With IBM's Callahan looking on, Hayashi and Ohnishi react with shock as two FBI agents step in to [illegible] and put them under arrest.*

FBI affidavit, Nakazawa said that he was aware of everything Garretson's company had provided and that it had been helpful. He also said he was aware of the risks involved.

As the Japanese shopping list grew ever longer, the sting operation became a great pain for IBM. Callahan had to have people scrambling between IBM plants and research labs collecting the desired items. The executives privy to the plot began to worry that they had been giving away too much. IBM told the FBI it could not allow another batch of material to leave the U.S.

From that point the sting rolled toward the climax. Hitachi was offered a package deal that would give the company just about everything it wanted. The Hitachi people requested a long list of items that included design documents and components for every major part of the 3081 computer. Garretson set the price at $700,000. After some haggling the two sides settled on $525,000.

At precisely 9 A.M. on June 22 a brown Volkswagen van belonging to paymaster Tom Yoshida braked to a stop in front of the Glenmar offices. Hayashi and Ohnishi climbed out; Yoshida remained at the wheel.

As he entered the room in which the IBM booty was stacked on a table, Hayashi could hardly contain his delight. Triumphantly he seized one [illegible] and ripped off the sticky IBM label. With a flourish, he pasted the famed IBM logo on his notebook, souvenir of a job well done.

At that moment, two other men stepped into the room. "It is all over," said one of them. "We are FBI agents."

The two Japanese reacted with stunned disbelief. So too did their country—at first. Then Japan's mood quickly changed as Tokyo's sensationalist newspapers pounced on the story and sent reporters scurrying through Silicon Valley. Under a variety of titles and datelines, the theme was always the same: the entire episode was a dirty Yankee trick, aimed at bashing the Japanese. Against the backdrop of trade tensions between the U.S. and Japan, the public readily believed these stories—a readiness enhanced by a sense of outrage over the sting tactics. In Japan undercover operations are limited by law to the investigation of drug-related crimes.

Since Hitachi prides itself on being an innovative company, it was especially vulnerable to embarrassment. In the immediate aftermath of the arrests, it behaved as if it had indeed lost face. It suspended advertising, rejected press requests for interviews, and in general hid behind the shoji screen. Within a short time, however, Hitachi began to realize that the public was not crying out for corporate hara-kiri.

Quite the contrary—Hitachi started to benefit from its role as a victim. After sampling his countrymen's reactions, Yasuo Naito, the editor-in-chief of Tokyo's respected bimonthly *Nikkei Computer*, found that "many users of IBM machines have told me they are thinking of switching to Hitachi." One Hitachi marketing executive claims sales of computers are rising on a wave of sympathy. Hitachi even scored a heartening triumph in the U.S., when the Social Security Administration bought two Hitachi-manufactured computers for $7 million, instead of a more expensive IBM system.

AS ITS CONFIDENCE returned, Hitachi began to regard the sting as only a delay and not a derailment of its onward drive in the computer field. Its newest supercomputer—the S-810—was announced only one week behind schedule last August. The new Hitachi computer closest to the IBM 3081 has also made its debut, despite the company's failure to get hold of all the IBM secrets it was after. But that does not mean the sought-after information was of little value after all. Far from it. What Hitachi was most interested in getting, it appears, was information on IBM's design directions. If Hitachi had obtained all it wanted, it might now have better prospects of narrowing IBM's lead in the development race.

Heartened by public support, Hitachi came out from behind the screen. It resumed advertising, with stress on innovation. One of its recent publicity releases points out that the company employs more Ph.D.s than the University of Tokyo.

Because of the public's perception that there was no guilt on the Japanese side, Hitachi finally felt able to do what otherwise would have been almost impossible for a Japanese company—plead guilty. At a press conference in Tokyo, a Hitachi spokesman said the guilty plea would have no effect on the future operations of the company.

■ For any company with valuable secrets, eternal vigilance is the price of keeping them. In starting a criminal case against Hitachi and participating in the sting, IBM was sending a message, not just to Hitachi but to the entire computer world, that it means to protect its secrets and will go to great lengths to do so. When Judge Williams imposed those fines in San Francisco last week, he said he hoped "that this example will be felt in other corporations throughout the world." A total of $24,000 in fines is not all that impressive a deterrent in a big-money game. The sting, however, is something IBM's competitors won't soon forget. ■

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Senator **Wilson**. This morning we will take testimony from two individuals extremely knowledgeable about the efforts of the United States semiconductor industry to compete with the Japanese. The first of our witnesses is Mr. Clyde Prestowitz, counselor to the Secretary of Commerce for Japan Affairs, a man whose travels on behalf of our Government's pursuit of open markets may by now have made him a perpetual member of the million mileage plans of at least two airlines.

Following his testimony, we will hear from Mr. W.J. Sanders III, the chairman and president and CEO of Advanced Micro Devices, who today is also appearing on behalf of the Semiconductor Industry Association. He will be accompanied by Mr. Gilbert Amerlio, president of the Semiconductor Products Division of Rockwell International, who is also a member of the Semiconductor Industry Association's board of directors.

Mr. Prestowitz, we welcome you and are eager to hear your testimony.

STATEMENT OF CLYDE V. PRESTOWITZ, COUNSELOR TO THE SECRETARY OF COMMERCE FOR JAPAN AFFAIRS

Mr. **Prestowitz**. Thank you, Senator Wilson. You're quite right about the mileage. The only problem is the Government doesn't allow us to take advantage of those.

Senator **Wilson**. I sympathize.

Mr. **Prestowitz**. I have a prepared statement which I would like to submit for the record. I would just make a short statement and say that I personally have been involved in negotiations with Japan on semiconductors for the past 4 years and during that time I have served as cochairman on the United States side of the High Technology Working Group, and a great deal of the efforts of my group were devoted to problems in the semiconductor trade.

We negotiated two arrangements with the Japanese, one of them called The High Technology Agreement, the other called The Semiconductor Agreement. Those discussions and arrangements dealt with such issues as predatory pricing, access to the Japanese market, intellectual property protection, and maintenance of the rules of the free market.

They also dealt in the second agreement with concrete efforts by the Japanese Government to enhance access to its market and, indeed, the Government of Japan undertook to encourage its semiconductor users to develop closer ties with American manufacturers and over a longer period of time to contract long-term contracts with them.

There was a time in the spring and summer of 1984 when it appeared that the agreement had had some effect. Since that time, developments have gone very much in the other direction and today the United States penetration of the Japanese semiconductor market is less than it has been for quite some time.

You mentioned the cases that have been filed, the 301 unfair trade case, filed by the semiconductor industry, and the two antidumping cases. Those are currently under active consideration by the Commerce Department and USTR and I expect that we will be hearing more, particularly about the dumping cases, in the near future.

The President recently has made several announcements about his desire to maintain a free and fair trade environment and has asked the Secretary of Commerce to chair a strike force to deal with unfair trade activities. We have been meeting this week and will be meeting next week on a variety of unfair trading activities in conjunction with that committee and certainly these issues will come before it.

With that, I'd like to take you questions.

Senator **Wilson**. Thank you very much, Mr. Prestowitz. Your prepared statement will be inserted in its entirety in the record at this point.

[The prepared statement of Mr. Prestowitz follows:]

PREPARED STATEMENT OF CLYDE V. PRESTOWITZ

MR. CHAIRMAN:

THANK YOU FOR THIS OPPORTUNITY TO DISCUSS THE STATUS OF U.S.-JAPAN TRADE IN SEMICONDUCTORS.

A LITTLE OVER TWO MONTHS AGO, I TESTIFIED BEFORE THE SENATE BANKING COMMITTEE ON THIS SUBJECT. MY STATEMENT ON THAT OCCASION HIGHLIGHTED SEVERAL IMPORTANT POINTS ABOUT THE COMPETITIVE POSTURE OF OUR INDUSTRY.

-THE U.S. SEMICONDUCTOR INDUSTRY HAS HISTORICALLY RESPONDED TO INTENSE COMPETITION--COMPETITION AMONG DOMESTIC COMPANIES AS WELL AS WITH JAPANESE AND EUROPEAN FIRMS--BY A PRODUCING A CONTINUOUS STREAM OF NEW DEVICES, REDUCING PRODUCTION COSTS, AND EXPANDING APPLICATIONS, CREATING NEW AND LARGER MARKETS.

-OUR INDUSTRY HAS MADE A SUBSTANTIAL INVESTMENT IN R&D TO MAINTAIN TECHNOLOGICAL LEADERSHIP. IN 1984, THESE R&D EXPENDITURES EXCEEDED $1.8 BILLION, MORE THAN 10 PERCENT OF TOTAL INDUSTRY REVENUES. AND IN MOST MARKET SEGMENTS, THIS COMMITMENT TRANSLATES INTO U.S. LEADERSHIP. IN MICROPROCESSORS, PROGRAMMABLE MEMORIES, AND BIPOLAR LOGIC, AMERICAN COMPANIES SET THE PACE.

-THIS INDUSTRY HAS ACHIEVED STARTLING REDUCTIONS IN UNIT PRODUCTION COSTS. LARGE AUTOMATED FACILITIES AND HIGH-VOLUME MANUFACTURING HAVE COMBINED WITH TECHNOLOGICAL DEVELOPMENTS TO GENERATE A 20 PERCENT PER YEAR DECLINE IN THE PRICE PER SEMICONDUCTOR FUNCTION. IN SOME PARTS OF THE MARKET, THIS MEASURE OF PROGRESS--OVER THE LONG TERM--RUNS AS HIGH AS 40 PERCENT PER YEAR.

-OUR COMPANIES ARE EFFICIENT ON A GLOBAL SCALE. THEY HAVE OPENED PRODUCT DESIGN AND DEVELOPMENT CENTERS IN EUROPE AND JAPAN WHICH TAP FOREIGN ENGINEERING TALENT. TO LOWER PRODUCTION COSTS, THEY HAVE GONE OFFSHORE FOR LESS SKILL-INTENSIVE PRODUCTION PROCESSES. FINALLY, TO IMPROVE MARKET ACCESS IN JAPAN AND IN EUROPE, U.S. CHIPMAKERS HAVE ESTABLISHED IN THESE COUNTRIES NOT ONLY ASSEMBLY OPERATIONS, BUT ALSO THE MORE SOPHISTICATED WAFER PROCESSING FACILITIES.

DETERIORATING DOMESTIC AND FOREIGN MARKET POSITION

DESPITE THESE STEPS, THE U.S. SEMICONDUCTOR INDUSTRY IN 1985 FINDS ITSELF BELEAGUERED BY FOREIGN COMPETITION. U.S. SEMICONDUCTOR PRODUCTION WILL DECLINE THIS YEAR, FALLING TO $15.0 BILLION FROM THE $18.0 BILLION SHIPPED LAST YEAR. EMPLOYMENT WILL ALSO BE OFF. A WALL STREET JOURNAL ARTICLE OF JULY 24, 1985 REPORTED THE LOSS OF 3,600 JOBS IN SILICON VALLEY ALONE SINCE THE BEGINNING OF THE YEAR.

THIS DECREASE IN PRODUCTION AND EMPLOYMENT IS DUE IN LARGE PART TO THE SOFTENING OF THE COMPUTER MARKET, THE SEMICONDUCTOR INDUSTRY'S LARGEST SINGLE END-USER, AND RISING IMPORTS. A LONG-STANDING MULTILATERAL TRADE SURPLUS TURNED TO A DEFICIT IN 1982. BY YEAR-END 1984, THE FIGURES SHOWED AN OVERALL SHORTFALL OF OVER $2.3 BILLION. THE PRIMARY REASON BEHIND THAT IMBALANCE WAS A CONTINUING SURGE OF SEMICONDUCTOR IMPORTS FROM JAPAN. IN 1984, IMPORTS FROM JAPAN REACHED $2 BILLION, MORE THAN TWICE THE LEVEL OF THE PREVIOUS YEAR.

IN THE FIRST HALF OF 1985, OUR DEFICIT WITH JAPAN CONTINUED TO CLIMB DESPITE THE SEVERE INDUSTRY RECESSION. IMPORTS FROM JAPAN FELL BY 4 PERCENT DURING THE PERIOD, BUT GIVEN THE 15 PERCENT DROP IN TOTAL U.S. CONSUMPTION, THIS STILL REPRESENTED A NET GAIN IN MARKET SHARE. MEANWHILE, U.S. EXPORTS TO JAPAN FELL BY 28 PERCENT OVER THE SAME SIX MONTHS, REFLECTING THE CONTINUING MARKET ACCESS PROBLEMS OF AMERICAN MANUFACTURERS.

THE DRAMATIC OVERALL SHIFT IN THE TRADE BALANCE IS DUE ALMOST ENTIRELY TO SLOW GROWTH IN U.S. EXPORTS OF COMPLETED DEVICES AND A LONG-TERM INCREASE IN IMPORTS OF FOREIGN-OWNED DEVICES. IMPORTS OF THIS TYPE HAVE GROWN AT ALMOST 50 PERCENT PER YEAR SINCE 1978, WHILE EXPORTS HAVE EXPANDED AT A RATE OF ONLY 17 PERCENT PER YEAR. MOST OF THIS INFLUX IS TRACEABLE DIRECTLY TO JAPAN.

From 1980 to 1984, the Japanese share of the world semiconductor market increased by about 25 percent to 27.5 percent, largely at the expense of the market share of U.S. firms. During that same period, the penetration ratio of Japanese imports in the U.S. market tripled, and our bilateral trade deficit with Japan in semiconductors increased nearly eight times to over $1.5 billion. At the same time, the import penetration ratio of our firms in the Japanese market actually declined, and our total share of the Japanese market continues to stagnate at near 10 percent. Despite the removal of formal barriers, despite ostensibly liberal access, and then despite supposed programs to foster imports of U.S. chips, the American share of Japan's semiconductor market stayed remarkably constant, and at depressed levels (never above 13% during the last decade) that bore no relationship to U.S. competitive capabilities.

These developments have taken place against the backdrop of a long-term joint effort by the Japanese Government and industry to develop a world class position in semiconductor devices. Key elements of the program included:

-Home market protection, including high tariffs, quotas, and restrictions on U.S. investment;

-Substantial financial support for cooperative R&D. Altogether, the Japanese Government funded over 60 different projects. The VLSI project alone, which produced over 1000 patents, was budgeted for $132.3 million between 1976-79.

-Government efforts to develop a highly integrated, concentrated, interdependent industry structure.

Overt protection of the Japanese market was eliminated by 1976, but the "Third Extraordinary Measures Law for Promotion of Specific Electronic and Machinery Industries," the so-called KIJOHO, continued in effect until the end of June of this year. It provided the legal basis for MITI to continue to foster cooperation among the big six Japanese semiconductor firms on joint R&D projects. It also directed industry effort into specific technologies and directed MITI to see to it that funding would be available for approved research and investment.

Whether or not these efforts were the cause, Japan's success in the semiconductor industry is suggested by the following statistics:

- In 1968, the industry was almost completely dominated by production for consumer electronic products. Sophisticated integrated circuit (IC) production had reached only $24 million out of a total yearly semiconductor production of $252 million, and a total component production of $1.4 billion.

- By 1978, sophisticated, international, state-of-the-art IC production for computer and telecommunications equipment had reached $1.2 billion out of $2.4 billion total semiconductor production and total component production of $8.75 billion.

-Integrated circuits now dominate Japanese microelectronic production. Random-access memories have clearly become a specialty--Japan holds a 90 percent share of the world 256K DRAM market and will be the first to introduce a 1-Megabit device into the commercial marketplace. But Japanese companies are now also using this commercial base to diversify into a broad variety of chips. Their domestic end-use pattern, while still consumer-intensive, now affords greater opportunities for devices oriented towards telecommunications and computer applications.

Sources of Trade Friction

The sharp differences in the approach of these two industries--a very open U.S. market and a historically protected Japanese market--have led, almost inevitably, to trade conflict.

Early in the life cycle of the 64K RAM, rapid Japanese penetration of this market led to formation of the High Tech Work Group in 1981. The Working Group eventually adopted a series of joint recommendations on semiconductor trade between the two countries which were endorsed by the Japanese and the U.S. cabinets in late 1983. The two governments agreed:

- To mutually eliminate their tariffs on semiconductors;

- To provide protection against the copying of chips; and,

- To establish a Joint Data Collection System to monitor trends in the industry in order to prevent unnecessary friction and misunderstanding.

Each of these goals has been achieved.

At the same time, the Japanese Government undertook to promote imports of U.S.-based semiconductor products, and MITI in fact called in the leading Japanese semiconductor consumers to encourage them to develop long-term supplier relationships with U.S. firms. In this area, we were less successful.

For a brief time, U.S. sales did increase. But this coincided with a period of very strong demand--and tight supplies--in the global market. U.S. suppliers responded to Japanese orders by according Japanese customers priority--even at the expense of long-term domestic buyers.

With the downturn in the world semiconductor market, U.S. sales to Japan have declined--both in absolute value and in terms of market share. In retrospect, it appears that purchases in early 1984 were opportunistic and did not lead to any long-term relationships.

It is clear that any future attempt to open the Japanese semiconductor market must finally solve the question of how we can create a long-term role for U.S. companies which is consistent with our global competitive position, in this pattern of established supplier relationships. These are often a matter of private business practices, as much as government policy, but they exist with the approval--or at least the acquiescence--of the Japanese government.

Current Trade Investigations

I will not comment on the merits of the Section 301 Petition filed by the Semiconductor Industry Association. I can report that, since I last testified at the end of July, USTR has advised the Government of Japan that we will pursue the case, and we have recently transmitted to the Japanese Government a list of questions regarding government policies and industry practices which we feel bear on some of the allegations in the petition.

Nor can I comment on the progress of the two dumping petitions--one relating to 64K DRAM and one to EPROMs--which are currently being investigated by the Department of Commerce, or the Department of Justice's investigation of possible possible predatory semiconductor pricing by Japanese subsidiaries in the U.S.

At issue in these petitions and investigations is whether Japan and its semiconductor firms are playing fairly, by the rules of the world trading system, in this industry. This question is basic to the President's trade policy as spelled out in his September 23 announcement. How it works in practice is clear if we look at our comprehensive approach to this industry.

-We are vigorously enforcing existing trade laws. We are moving forward with the 301 investigation, and I interpret the filing of the latest EPROM case as a vote of confidence in this Administration's determination to provide fullest protection of the laws where illegal pricing practices are involved.

-The international protection of intellectual property rights--a key feature of the President's program--is critical to this industry. We have already convinced the Japanese of the need to provide special protection for chip designs, and we will be pursuing this issue with other important East Asian producers, especially the Koreans and Taiwanese.

-To move aggressively against unfair trade practices the President has established a Strike Force chaired by Secretary Baldrige. The Secretary has asked me to direct the day-to-day work of this group, and I can assure you that problems such as those facing our semiconductor industry will be at the top of our agenda.

Our semiconductor industry is a highly competitive, internationally efficient, high technology industry which is facing stiff--and arguably unfair--foreign competition. The President's trade policy announcement sends a clear message that we will act--and act effectively--in such cases.

Senator WILSON. If we are successful in removing all official Japanese governmental constraints on United States access to their semiconductor markets, to the Japanese market, and yet we still have trouble increasing our market share above 10 or 11 percent, there are some Japanese spokesmen who have said that there is nothing more to be done, that if we have access and are allowed to compete that is the end of it.

In fact, during my recent trip to Japan with Majority Leader Dole, I was told by a senior official of MITI that the Government, specifically MITI, were no longer responsible for directing the efforts of the Japanese semiconductor industry. That is markedly at variance with what you have to tell us this morning.

You indicate in your statement very clearly that until recently the Japanese Government was up to its elbows in directing industry efforts and its marketing strategies. There is also testimony before the Foreign Relations Committee that suggests very strongly the same direction of private industry efforts in Japan and that this is very much an ongoing feature of the relationship between Government and Japanese industry and specifically the Japanese semiconductor industry.

If the Japanese Government is responsible for structuring its semiconductor market so that it is impenetrable by outsiders, in your judgment, does the Japanese Government have a responsibility to unwrap this very tightly packaged market so that it can be experienced by others to an extent greater than 11 percent?

It's notable I think that that market share has been unvarying over about the past 20 years, while U.S. semiconductors, particularly chips, have more than 55 percent of the European market and done very well elsewhere in the world.

Mr. PRESTOWITZ. What we are dealing with is the question of industrial policy and its impact in both short term and long term. I don't know that the Japanese Government today is actively directing Japanese companies in their marketing or production activity. There certainly continue to be a number of cooperative government and industry research and development projects, some of which receive partial funding from the Government, but one of the aspects that we are dealing with here is something like the following: Japanese companies have added and are continuing to add substantial capacity into a market which is already burdened with a surplus of capacity.

And you ask yourself, well, why does that happen? How can it happen? If these are private companies which have to make a profit to exist, why is it that they would add capacity in a surplus capacity situation?

Well, there are several reasons for that. One of them has to do with the capital structure of the Japanese companies themselves. The shareholders tend to be large financial institutions or other related institutions. The Japanese companies' responsibility to their shareholders is much different than that of an American company. So, effectively, they are able to sustain losses for a longer period of time than a company could in what we think of as a normal capital market environment.

Second, the Japanese Government has on the books a number of laws which permit it to come to the aid of distressed industries. So that when industries get into losing situations, they may petition the Government to ask for a suspension of the antitrust laws, engage in cooperative planning of capacity and market allocation.

Now the semiconductor industry in Japan is not doing that now. They are not making use of those laws. And so it would be impossible right now to accuse the Japanese Government of taking some direct action to direct the capacity allocation or cartel operation. Yet the companies all know that those laws exist, so they know that if they get in real trouble there's a safety net there. And knowing that there's a safety net, it then greatly reduces the risk that they face in adding capacity in a down market situation.

Now that addition of capacity has the effect on not just the Japanese market but on the American and worldwide markets because those products find their way into the worldwide market and they get sold at very low prices. Part of that happens because of the safety net that I described.

Yet it's not clear that you can, under existing United States law or international convention, point to the existence of a safety net which is part of Japan's industrial policy and say that that is restricting trade at the moment. It may have the effect of restricting trade in the future, but it doesn't necessarily restrict it now.

Similarly, many of the effects that our industry is feeling today are things that are effects that result from actions that were taken 8 or 9 or 10 years ago. Again, it's difficult under our law to say that the effects that people are feeling today from an action taken 10 years ago are unfair trade. And yet that's what's happening.

So by way of a rather long-winded response to your question, I guess what I'm saying is that the kind of normal reflex responses that we tend to have toward unfair trade activities may not be adequate to deal with the situation that we face in this kind of industry with Japan or with some other countries, and what we have been trying to do is to negotiate with the Japanese Government to urge them to in effect take steps which would ameliorate the impact of these industrial policies.

The great difficulty is that it's relatively easy for the Government of Japan to direct or guide or encourage industries in directions that industries naturally want to go anyhow. It's more difficult for them to encourage or guide in directions in which the industries really don't want to go, particularly when the industries are very sizable and powerful in Japan.

In that regard, I guess I'd like to quote a couple conversations I had recently. I was talking to a friend of mine who is a very high-ranking executive in one of Japan's major semiconductor manufacturers. I have known him for quite sometime and this was a situation in which we could have an honest conversation.

He said to me:

> Look, Clyde, the fact is, forget about the Japanese Government. The Japanese semiconductor consumers-users are going to buy from withn their own company first, within their economic group second, within Japan thirdly, and only last from a foreign supplier.

Senator WILSON. Would you describe that situation as free trade?

Mr. PRESTOWITZ. It's not a market in the sense that we in the United States think of a market. On the other hand, let me suggest that General Motors has subsidiaries and it buys from its subsidiaries upon occasion.

Senator WILSON. Upon occasion, but aren't they also bound by company policies that dictate that they get the best price and the best quality to buy from whoever offers it whether it be their subsidiary or some competitor?

Mr. PRESTOWITZ. Sure. They are bound by U.S. antitrust and price-fixing law. And Japan has an antitrust law, too.

Senator WILSON. I want to get to that, but go ahead.

Mr. PRESTOWITZ. Let me stop there and you can ask more questions. What I'm trying to suggest is that the nature of the problem is one that really goes deep into the structure and nature of Japanese industry and business practices.

Senator WILSON. Well, I think you have described the situation as it in fact exists, that the Japanese have institutionalized practices which in this country would be illegal.

The question may be whether they're not also illegal in Japan. You've mentioned antitrust laws. I have had Japanese officials say to me that in effect, "We are operating hands off. We are not directing anybody."

Is that a sufficient response when Japan itself has virtually the same antitrust laws as the United States, having received theirs from us as a legacy of General McArthur's administration? Those laws remain on the books today, but my impression is that they are largely unenforced, that this handsoff policy applies with special application to a lack of enforcement of antitrust laws, and my question is, have we pressed the Japanese to enforce their own antimonopoly laws?

Mr. PRESTOWITZ. Yes, we have. We have had actually one or two instances of success. While it's true that the Japanese antitrust law to some extent mirrors ours, there are a couple of significant differences. One is that private parties do not bring suit in Japan. An antitrust investigation must be triggered by the Japanese Fair Trade Commission and they do not have triple damages.

The Japanese Trade Commission is a relatively small body, small budget, small staff, and its ability to act is therefore somewhat circumscribed.

Senator WILSON. Do you think it's circumscribed by the resources allocated to it by the Government?

Mr. PRESTOWITZ. To some extent, yes, I believe so.

Senator WILSON. Well, that would seem curable by their allocating more.

Mr. PRESTOWITZ. Might be.

Senator WILSON. What record is there of U.S. governmental efforts in this area? What record is there of our having applied pressure to the Japanese to enforce their own antitrust laws?

I think the point is one deserving of attention and I think you're right, they allocate little in the way of resources to enforcement of the antitrust laws. They allocate far more to the staffing of MITI and I suspect if we were able to really examine the books we would find that they allocate a great deal more to providing that so-called safety net.

Mr. PRESTOWITZ. I am not familiar really with the exact figures on an allocation of resources, but MITI's budget is not a large budget but it is bigger than the Federal Trade Commission's in Japan.

We have pressed them, Senator, and in fact, as I said, in one case—the case of soda ash—in response to our concerns an investigation was launched, a cartel was discovered, a cease and desist order was issued and U.S. exports increased by about sixfold.

We have pressed them in the area of semiconductors. There have been some actual investigations in the area of semiconductors and they have concluded, whether rightly or wrongly, that there is no cartel activity in Japan.

Senator WILSON. I would like the committee to formally pursue the record of the United States efforts to secure enforcement of Japanese antitrust legislation. Your response, Mr. Prestowitz, is one that I think needs amplification. I would like a little more systematic examination of what we have done.

Mr. PRESTOWITZ. Well, let me add one thing then. As I mentioned, we have negotiated two agreements with Japan on semiconductors and one of the clauses in both of them deals with maintaining the rules of a free market. And in the first agreement the Japanese Government undertook to vigorously enforce its laws to maintain the free market rules of fair and open access.

Senator WILSON. Would you bring the microphone a little closer? I'm having difficulty with the acoustics in this room.

Mr. PRESTOWITZ. As I said, in the first agreement the Japanese Government undertook to vigorously enforce its laws related to maintaining an open and fair and free market.

In the second agreement it undertook to introduce legislation to protect proprietary designs and proprietary semiconductor chips and to prevent predatory activities.

So it is an issue that we have addressed. The United States Government has raised this issue with the Japanese in virtually every negotiation in which I've been involved and we do have those two agreements on paper.

It's just not possible for me or any other Government official to go to Japan and actually force them to take particular steps. To the extent that we have been able to raise this issue and press it upon them, we have.

Senator WILSON. There are some in the United States who say that our antitrust laws need revision. Some Japanese officials in conversations have suggested that our antitrust laws need revision to allow us to compete with them and that that's not their fault.

In fact, we have revised our antitrust laws in some significant aspects that does permit that. Yet, basically, I think it's clear that we are not going to relax the kind of protections of U.S. consumers that gave rise to some of the basic antimonopoly protections.

That being the case, assuming we are not going to loosen our own antitrust laws in those basic applications, if Japanese companies under governmental direction divide up world markets—that is, if one takes EPROM's and another takes 12K D-RAM's or if one takes Europe and the other takes the United States, should not this activity be actionable under our antitrust laws?

Mr. PRESTOWITZ. Well, to the extent that the activity occurs in the jurisdiction that is covered by our antitrust laws, yes.

Senator **Wilson**. Well, it certainly would occur where they are selling them in the United States.

Mr. **Prestowitz**. I'm not an antitrust expert, Senator, I am not familiar with how the law applies extraterritorially. If the items are made in Tokyo I'm not sure how we apply the law. But certainly, where the root of our law runs, any antitrust violations should be prosecuted.

Senator **Wilson**. Where there is the kind of complicity that I'm talking about where the Government is involved in a marketing strategy—the Japanese Government with Japanese industry—there are some who would say that we cannot thereafter enforce United States antitrust laws against a Japanese company under the doctrine of foreign governmental compulsion.

Now is that an official policy of this Government?

Mr. **Prestowitz**. Well, I think that question is before the court right now. I believe the Supreme Court is dealing with that question right now in the case of the Japanese color television case. So I'm not sure that I'm competent to answer the question.

Senator **Wilson**. Well, I will not press you further on it. I do intend to press the Government on that and I will tell you that it seems to me that the enunciation of the doctrine of foreign governmental compulsion is one that needs the closest scrutiny—and in fact, I will go farther and say—rejection, except where there is a genuine innocence on the part of the company that is clearly beyond doubt. It is a dodge, plain and simple, to allow unfair competition, and I think we would be fools to simply accept that, particularly when we are getting these conflicting stories about the actual role of the Japanese and the Japanese Government.

At this point, let me welcome Senator D'Amato of New York, a member of the committee.

Senator **D'Amato**. Senator Wilson, first of all, let me commend you for holding this hearing today on the Japanese semiconductor industry, an industry which is vitally important to your constituents in California, but also very important to America as a whole—going to the heart of whether or not we continue to suffer an erosion of our industrial technical base.

I might say at the outset that we are under some time constraints, so I'm going to ask if I might be permitted to offer my written opening statement in its entirety for the record.

Senator **Wilson**. By all means.

[The written opening statement of Senator D'Amato follows:]

WRITTEN OPENING STATEMENT OF SENATOR D'AMATO

MR. CHAIRMAN, I COMMEND YOU FOR HOLDING THIS HEARING TODAY ON "U.S. - JAPANESE TRADE IN SEMICONDUCTORS." THE SEMICONDUCTOR INDUSTRY IS THE LATEST MARKET THAT THE JAPANESE HAVE BEGUN TO SQUEEZE U.S. MANUFACTURERS OUT OF BUSINESS.

TODAY, THE UNITED STATES TRADE DEFICIT TOTALS AN UNPRECEDENTED $123 BILLION AND IT IS EXPECTED TO EXCEED $150 BILLION BY THE END OF THE YEAR. IT IS NOT SURPRISING THAT JAPAN IS THE COUNTRY RESPONSIBLE FOR MUCH OF THE DOMESTIC SEMICONDUCTOR INDUSTRY'S WOES SINCE JAPAN IS ALSO THE LARGEST CONTRIBUTOR TO OUR NATION'S TRADE DEFICIT TO THE TUNE OF $37 BILLION.

SEMICONDUCTOR TRADE MUST BE VIEWED WITHIN THE LARGER CONTEXT OF THE UNITED STATES' COMPETITIVENESS IN THE 'HIGH-TECH' SECTOR, A SECTOR WHICH COMMANDS AN INCREASINGLY LARGER SHARE OF AMERICAN TRADE IN

MANUFACTURED GOODS. LAST YEAR, HIGH-TECH GOODS ACCOUNTED FOR 43% OF OUR EXPORTS AND 25% OF OUR IMPORTS. HOWEVER, IT IS EXTREMELY TROUBLING TO LEARN THAT OUR HIGH-TECH TRADE SURPLUSES HAVE SIGNIFICANTLY DECLINED, FROM $26.6 BILLION IN 1980 TO A MERE $6.2 BILLION IN 1984.

THE SEMICONDUCTOR INDUSTRY IS THE LEADER IN THE HIGH-TECH SECTOR. IN 1984, THE INDUSTRY EMPLOYED APPROXIMATELY 200,000 WORKERS AND GENERATED MORE THAN $20 BILLION IN SALES. THE JAPANESE, HOWEVER, SEEM DETERMINED TO DOMINATE THE INDUSTRY AND ARE USING UNFAIR TACTICS TO ACCOMPLISH THIS GOAL.

EXAMINING THE BROAD TRADE PICTURE, WE FIND THAT THE JAPANESE ARE NOT ALONE IN USING UNFAIR TRADE PRACTICES TO CLAIM A LARGER SHARE OF THE PROFITABLE U.S. MARKETPLACE. TAIWAN, SOUTH KOREA AND HONG KONG ALSO SUBSIDIZE THEIR INDUSTRIES AND PERMIT THE PIRATING OF U.S. PRODUCTS.

DURING THE MONTH OF AUGUST, I HELD HEARINGS ON INTERNATIONAL TRADE IN MY HOME STATE OF NEW YORK. I WAS SHOCKED AND ANGRY AT THE TESTIMONY I HEARD FROM FEDERAL OFFICIALS AND BUSINESSMEN. IN UTTER FRUSTRATION, THEY

DESCRIBED THE LACK OF ACCESS TO FOREIGN MARKETS, AND THE ILLEGAL TRADE PRACTICES THAT MANY OF OUR TRADING PARTNERS USE AGAINST US.

ONE WITNESS, WHOSE COMPANY IS A PIONEER IN CERAMICS, DESCRIBED THE RUN AROUND THAT U.S. COMPANIES ARE GIVEN IN TRYING TO OBTAIN A PATENT IN JAPAN -- THE 20 YEAR PATENT LIFE CAN EXPIRE BEFORE A U.S. APPLICANT EVEN HAS AN ENFORCEABLE PATENT. ADDING TO THEIR FRUSTRATION IS THAT JAPANESE FIRMS HAVE THE OPPORTUNITY TO COPY THE COMPANY'S PRODUCT. THESE COPIES ARE THEN SOLD, NOT ONLY IN JAPAN, BUT ALSO IN THE U.S. MARKET WHERE THEY COMPETE DIRECTLY WITH THE U.S. PATENT HOLDER'S PRODUCTS.

MR. CHAIRMAN, WE NEED A CONCERTED TRADE POLICY. WE MUST TIGHTED THE LOOPHOLES IN OUR CURRENT LAWS AND PASS NEW LEGISLATION THAT PROTECTS U.S. TECHNOLOGY AND INGENUITY. WE MUST IMPRESS UPON OUR TRADING PARTNERS THAT WE WILL NO LONGER TOLERATE THEIR PREDATORY TRADE PRACTICES; THEY MUST RECIPROCATE BY OPENING THEIR MARKETS TO U.S. PRODUCTS AS WE HAVE OPENED OUR MARKETPLACE TO THEM.

THANK YOU, MR. CHAIRMAN.

Senator D'AMATO. Let me make the observation that this Joint Economic Committee has held some field hearings in the area of trade and trade policies with the Japanese. Witness after witness testified to the incredible barriers that the Japanese constructed in an attempt to keep us from and impede us from obtaining patents, in battling United States companies from attempting to get any kind of share of market penetration in Japan, and then how they turned around and committed some of the most egregious, outrageous acts by way of intrusion on those patents, taking United States investment, and so forth, taking our own work product, and then selling those here in the United States of America.

Now let me say, Mr. Prestowitz, I certainly don't mean to come down on you, but the fact of the matter is that we have not responded adequately in seeing to it that existing laws are enforced, or coming forward and giving to the courts the ability to deal with these cases. Where there are infringements, and the court says, yes, there are, we have to show that there's substantial damage to the industry. It would seem to me that there should be legislative relief, and that you should be in the forefront in suggesting remedies to deal with these kinds of predatory practices. The American public, in certain cases, is being misled to believe that we cannot compete; that the Japanese have cornered the market because of their productive capacities and capabilities. There is clear evidence in case after case, in area after area, that they do so when they rob—they rob Americans of their productive genius, their investments, denying them that which they are entitled to, and then taking that work product and sending it back into this country.

Now, how long do we wait? Do you really believe that the Japanese are serious, that they really mean to lower their barriers? What is the sense of lowering a barrier after they have total market capacity, after we cannot compete, after they have knocked out of the industry those who could have been formidable competitors? I'll take you into the fiber optics area where we could have sold them five times cheaper—five times cheaper—and they wouldn't let us into their marketplace.

We should be outraged. The American people are told this story repeatedly, "Oh, we have to have better productivity in order to compete." When we do have better productivity, the Japanese Government constructs a policy of restraint.

Am I overstating the case, Counselor?

Mr. PRESTOWITZ. Well, I think you are aware that I have personally had discussions with Japan on this matter and the issue of an intellectual property is currently one that is the subject of potential legislation here on the Hill and it's also the subject of discussion in the Economic Policy Council, and I think that people are as concerned about it as you are and that there will be some further activity.

Senator D'AMATO. Have I overstated the case?

Mr. PRESTOWITZ. Well——

Senator D'AMATO. You know, if it was your company that had to deal with these kinds of practices—let me tell you, Corning Glass came in and testified for the record very clearly what they had to go through, and how they were denied an opportunity to sell their products, even though they were being sold, marketed, and were as efficient as the Japanese, but were five times cheaper—five times cheaper than what the Japanese eventually purchased. Now the Japanese are engaged in activities where they are producing four to five times what their domestic needs are, they're subsidizing that industry. Do you know where those fiber optics are going to be sold, and at significantly less than what Americans can produce them for? It will cost us jobs, and then we're going to hear some American public officials say, "We have to produce better. Now, of course, we should send them oil. That's going to lower the trade deficit."

What kind of nonsense is this?

Senator Wilson, I might just simply say to you that I just believe that this is nothing more than a charade, this whole business about attempting to change the balance of payments area to deal with the deficiencies and, more importantly, that the fact of what American businesses are entitled to is fair play. The American taxpayers are entitled to it, and I don't see this taking place.

This is based upon real fact, that many businessmen just simply don't have the time and money to stay in this area and maintain these suits. They take years and years, and then their own government seems to turn a deaf ear, if anything, taking a position in contravention of what is right. That really adds insult to injury.

Senator Wilson, let me say to you that I am anxious that the results of this hearing be made known to all, and I stand ready to assist you in your endeavors, whether they be legislative or whether they be attempting to see to it that the laws that we do have on the books are adequately enforced.

Senator **Wilson**. Thank you very much, Senator D'Amato. I think it's clear that we are going to be pursuing both lines, both new legislation and the enforcement of existing law. In fact, just before your entry, I had been pressing a line of questioning with Mr. Prestowitz having to do with United States efforts to secure enforcement of Japanese antitrust laws, in addition to the enforcement of the United States antitrust laws.

Let me now pursue a somewhat different tack with you, Mr. Prestowitz. Let's assume that we find that there is considerable difficulty in our securing enforcement by the Japanese of their own antitrust laws. Let's assume, for the sake of argument, that we encounter great difficulty in our own courts in securing the enforcement of our own antitrust laws.

Is not Congress then compelled, for all the reasons that Senator D'Amato has so eloquently stated, to face an unhappy necessity, and that is, are we not then required to prevent foreign monopolists from entering our own markets if we cannot attack their offshore conspiracies directly?

Mr. **Prestowitz**. Well, we certainly have a duty to proceed against any unfair trade activities; yes, sir.

Senator **Wilson**. Well, let me suggest that not very far into the future an attack of that kind is going to be made. It's going to be made by legislation. There are a number of us who have been longtime advocates of free trade and we have long since come to recognize that it is a foolish position to continue mouthing free trade if it's to be an empty phrase, and specifically as it relates to the Japanese—if there is no reciprocity, if there is no equity, if we find that we are being shut out of their markets while affording them liberal access to our own. But beyond that, what we are talking about today is something which has to do with far more than simple access. It has to do with what really is either a conspiracy in which the Japanese Government has been involved as a participant or they have been involved at the very least by the complicity of seeing no evil and exercising no control.

Moving then to the likely remedies that Congress will take if we think that it will take too long or be too uncertain to secure what we think is justice through the routes of the enforcement of Japanese or United States antitrust laws, which of the proposed remedies that are going to be offered to the Congress does your Department feel would be most consistent with the kind of equity that we are entitled to seek and the least offensive to a system of free trade? Let me outline two approaches in this regard: On the one hand, there is the Danforth legislation seeking reciprocity and directing the President to avail himself of a full array of tools that are available to him now under existing trade law. On the other hand, there is the far more far-reaching Bentsen-Rostenkowski approach of legislation that is not sectoral and indeed goes beyond reciprocity except in the broadest sense.

Would you comment on what you feel would be the strengths and weaknesses of these different approaches?

Mr. PRESTOWITZ. Well, I think you are aware that the administration has not yet taken a position with regard to the Danforth bill itself. In principle, the administration has been very reluctant about reciprocity legislation because of the potential destructive impact that that would have on the rest of our trade.

I think there's a great fear that reciprocity legislation could lead to kind of a chain reaction of strikes and counterstrikes.

However, the Commerce Department has had various discussions with Senator Danforth on this particular bill and we are hoping that we can continue to work with the Congress in a constructive way.

So far as the across-the-board approach presented by Congressman Rostenkowski, again I think you know the administration has been opposed to that. Our concern is that it would not, on the one hand, really solve the problem and, on the other hand, could lead very well to a trade war just at a time when the world desperately needs growing trade in order to divert the threat of recession. So we are opposed to that.

Senator WILSON. You are opposed to the Bentsen-Rostenkowski approach and have not yet taken a position on the Danforth reciprocity legislation?

Mr. PRESTOWITZ. That's right.

Senator WILSON. If the pending textile bill or the shoe bill were to become law over the President's veto, what effect do you see this having on United States-Japan trade relations? Specifically, as an example, could the MOSS talks proceed?

Mr. PRESTOWITZ. I personally doubt that passage of such legislation would have much effect on the United States-Japan trade relations. In fact, I believe it might have the effect of relieving the pressure on the Japanese because Japan is not directly very much affected by any legislation directed at either footwear or textiles. The major issues with Japan lie in other areas.

But if we direct all of our attention toward those areas, then almost inevitably it means a relaxation of the tension to the key areas with Japan. So I think it could be counterproductive from our point of view in terms of keeping the pressure on the Japanese to further open their market. That's a personal opinion.

Senator WILSON. You have a great deal of experience as a negotiator with the Japanese. You are currently seeing the sixth or so Japanese peace offensive since 1981 aimed at convincing us of their sincerity in trying to balance United States and Japanese trade.

What really do you think is their perception of this and do you see a solution to the trade problem as any way possible without Congress finally tiring of the mouthing of free trade as a slogan? I'll put it this way. I recently was invited to speak to the Japan Business Association of southern California. These are all representatives of Japanese industries operating in southern California. They are most welcome there. Their investment is an asset. They have been quite understandably courted. But what I told them, some of whom I have known in a prior incarnation as a mayor of a large southern California city seeking economic development and seeking Japanese investment, what I told them is that the current situation is one in which, to reduce things to the simplest terms, the doors to Japan's market are locked. They are excluding United States exporters from their markets and I told them that, plain and simple, those doors are going to come open either voluntarily with the key of Japanese cooperation; or if they remain locked they would be opened by the fire axe of American retaliation. That the choice essentially is theirs, except there is, of course, the choice that Congress must make as to precisely what instruments to apply.

Do you see any real alternative for the U.S. Congress than to at this point engage in a retaliation that is not itself protectionism but, rather, one that recognizes the distinction between protectionism of the kind that we have traditionally eschewed and the necessity to protect ourselves against protectionism?

Mr. PRESTOWITZ. Senator, I think that retaliation called retaliation is probably the worst of all possible worlds. I doubt that simply striking at the Japanese is going to give you the results that you want and we have an enormous interest in maintaining a constructive trade relationship with Japan.

The Japanese trade practices to date have been disappointing. I don't think there's any way to deny that. At the same time, I think that recent activity by the Prime Minister has been in fact quite courageous in the context of Japanese politics and I am hopeful that he and other leaders of Japan will be able to continue to act in a far-seeing and statesmanlike manner.

I think that the problems between our two countries result from really fundamentally different perceptions of how economies work and how the relations in trade between our two countries should be carried out, and I think it's absolutely essential that the two sides be able to resolve these problems through negotiation and through management rather than through retaliation.

Senator **Wilson**. Well, sir, I must tell you that, with all due respect, you and I have a fundamental disagreement there. That is the world as I wish we could expect it to be, but I don't know how much unhappy experience is required before we are compelled to recongize that's not the world as it is. I must say that there is an end to patience and I think there is an end to patience understandably on the part of those who can justifiably link their loss of market and their requirement to discharge employees to trading practices that are in fact unfair.

This industry upon which we are focusing today is not the steel industry. It is not an unproductive industry. It is a state-of-the-art industry. They can offer the highest quality at prices that are more than competitive. They are achieving market shares in the rest of the world that makes clear that they are competitive. Yet, for some mysterious reason, for 20 years their market share in Japan has been a flat 10 percent.

Now the problem is far broader than this industry. It's broader than the high-technology field. But it is clear to me that patience in dealing with this problem is going to lead to further disappointments and I think the time has come when we should stop turning the other cheek.

Mr. **Prestowitz**. Don't misunderstand me, Senator. I am not suggesting that we play patsy to the Japanese.

Senator **Wilson**. I think that's exactly what we have done.

Mr. **Prestowitz**. I think that there's no one in the United States Government who's been more active in trying to negotiate to put pressure on the Japanese to open their market, to resolve those problems. Certainly no one in the administration has been more supportive of the semiconductor industry than I have been. I think it is essential that we maintain pressure on Japan to give us the same kind of opportunity to participate in their economy that we give them to participate in our economy.

The thrust of my comments simply was I'm not sure that we can get there by blindly retaliating. I think it takes more.

Senator **Wilson**. I don't think we should engage in blind retaliation, but let me preface this on your comments about Prime Minister Nakasone. I think he is, indeed, a man of courage and vision. I think he sees very clearly the magnitude of the threat to what you described as a constructive relationship between Japan and the United States. There should, indeed, be one and there can be. We are dependent upon one another as one another's customers.

But what has occurred, through no fault of the Prime Minister's, is that he is facing protectionism within the Japanese Diet. Now I recognize protectionism in my country and I sure as hell recognize it in his, and when we're talking with people who simply refuse to allow competition to occur in their country, I think the only way that we can become credible to the Japanese is by retaliation. That is an unfortunate fact of life. I don't think they take rhetoric very seriously.

So I think the time has come, regrettably, when we are compelled to do two things: First, to insist upon fair access to their marketplace; and second, to insist that the access that we have provided them to ours not be unlimited, in the sense that we are willing to tolerate unfair trading practices, with respect to Japanese imports in this country.

It is true, without question, that American consumers have benefited from a number of Japanese imports to this Nation. They have received quality products. They have particularly benefited from price competition. Voluntary import restrictions on Japanese automobiles did not penalize the Japanese manufacturers, the automakers, to change their prices. They sent premium automobiles. The people who did suffer were the American consumers who wound up paying $1,200 per car more.

What I am looking at is simple equity both ways, both with respect to our being allowed to compete with the Japanese and with others in their markets. In fact, the size of the deficit is far less important to me than the magnitude of our exports. But what we are really focusing on here this morning relates to the domestic United States market and the world because what we are talking about, in my judgment, are conspiracies that allow the Japanese Government either through a see-no-evil policy or as an active partner to engage in practices that are clearly unfair, if they are not explicitly illegal under their law or ours, and I think the time has come for Congress to face that fact. Just as we are demanding market access and as we prepare to inflict retaliation in order to achieve it, it may be that we are going to have to keep some Japanese goods out also as a response to the kind of unfair trading practices that we have seen chronicled in this Fortune article and elsewhere.

Well, you have been generous with your time.

Mr. PRESTOWITZ. Senator, if I could, there's one question which was submitted to me in writing and I thought you were going to ask it, but I do have a response and I would like to give you that response.

Senator WILSON. Go ahead.

Mr. PRESTOWITZ. The question was: There's difference of opinion over what share of the Japanese semiconductor market is held by United States firms and what share of the United States market is held by Japanese firms?

This question stems, of course, from the recent publication by MITI figures showing that United States manufacturers have about a 20-percent share of the Japanese market and that Japanese manufacturers have about a 10-percent share of the United States market.

These figures, of course, were submitted or published by MITI in an effort to prove that the complaints of United States manufacturers are unjustified and that indeed they are doing quite well in the Japanese market.

This is a question that the Commerce Department has studied quite carefully. One of the results of our high-technology working group discussions was the establishment of a so-called data collection system and the purpose of a data collection system was precisely to collect concrete statistics from both sides that could be used in resolving future disputes on an objective basis.

When this dispute arose, of course, we expected that MITI would consult with us and that we would have recourse to these statistics gathered by both sides. But in fact they did not. They immediately published their own figures.

Now, as you know, statistics are a little bit like a coat of paint. They cover a multitude of sins. In the semiconductor industry, as in most other industries, there are various ways to look at penetration and market share and a great deal depends on how you define the market.

Let me say for the record that the statistics published by the Japanese side are both inaccurate and misleading, in our judgment, in the judgment of the experts in the Commerce Department on the semiconductor markets.

They overstate United States exports to Japan by about 100 percent. They understate the size of the Japanese market and they overstate the share of the United States manufacturers. Now I could give you a variety of shares of market and what I would like to do is to submit this report in its entirety to your committee, but let me say that the figures which we believe to be accurate show United States penetration of the Japanese market in the 12- to 15-percent range, and Japanese penetration of the United States market in the 15- to 20-percent range.

What is more important and I think the real key here is not the actual level of penetration but the trends. And under any set of statistics, whether it's the Japanese or data from the Commerce Department or any other set of statistics, the trends are clear that the United States share of the Japanese market has been stagnant for the last 10 years and the Japanese share of the United States market has risen dramatically. Thank you.

Senator WILSON. Thank you very much. I think that's a very valuable contribution and I'm grateful for the time that you've given us this morning. Thank you very much, Mr. Prestowitz.

Next we invite to the witness table Mr. W.J. Sanders, chairman, president, and chief executive officer of the Advanced Micro Devices. Mr. Sanders is appearing today on behalf of the Semiconductor Industry Association, as is Mr. Gilbert Amelio, who is accompanying him and is the president of the Semiconductor Products Division of Rockwell International.

Mr. WOLFF. I am Alan Wolff, counsel for the Semiconductor Industry Association.

Senator WILSON. Welcome, Mr. Wolff. Gentlemen, we are delighted to have you here and we are grateful for you coming and your patience.

STATEMENT OF W.J. SANDERS III, CHAIRMAN, PRESIDENT, AND CHIEF EXECUTIVE OFFICER, ADVANCED MICRO DEVICES, ON BEHALF OF THE SEMICONDUCTOR INDUSTRY ASSOCIATION, ACCOMPANIED BY GILBERT AMELIO, PRESIDENT, SEMICONDUCTOR PRODUCTS DIVISION OF ROCKWELL INTERNATIONAL; AND ALAN WOLFF, COUNSEL, SEMICONDUCTOR INDUSTRY ASSOCIATION

Mr. SANDERS. Senator, I have a prepared statement that I would like to put in the record.

Senator Wilson. We would be delighted to put your prepared statement in the record in its entirety at the end of your oral remarks.

Mr. Sanders. My name is Jerry Sanders. I am chairman, president, and chief executive officer of the Advanced Micro Devices, a leading United States manufacturer of semiconductor products. I am also a founding member of the board of directors of the Semiconductor Industry Association, the SIA, and as you said, I am testifying today on behalf of that association.

I'd like to thank you for the opportunity to discuss with you and your committee some ways in which America can remain first in information technologies and to review the current trade situation in the semiconductor industry.

The question to address is: How do we assure that there will be a U.S. semiconductor industry in 10 years?

The information technologies are quite simply the core of the next industrial era, just as the steel, chemical, and automobile industries have been the core industries of the 20th century. It is critically important that the United States continue to lead the world in technological advancement in the production of computers, communication products, software, instruments, robotics, and semiconductors. My mission here today is to champion the cause of keeping America first in information technology.

The Japanese know that in this "information age," leadership in information technology equates to leadership in commerce. They also know that it is impossible to be first in information technology without also being first in semiconductor technology. This is why the Japanese have expended enormous sums of money over the past several decades in an effort to gain parity in semiconductor technology. It holds the key to supremacy in information technology.

The mutual course is growth, specifically growth in number of jobs. I told the members of the Commonwealth Club in San Francisco a few weeks ago that millions of new jobs have been created in America in the past few years. Unfortunately, not all jobs are created equally. Some jobs pay more than others. Some types of employment, such as manufacturing jobs, create more wealth and have a greater economic multiplier effect than others. While America has been creating new jobs in the lower paying service sector, we've actually deleted jobs in the manufacturing sector.

The result of this shift in emphasis speaks for itself. In manufacturing fields, hourly earnings on an inflation adjusted basis for American workers were lower than 10 years ago. We're losing ground.

One of the most significant factors in the loss of manufacturing jobs has been America's enormous trade deficit. The U.S. Department of Commerce calculates that every $1 billion added to the trade deficit amounts to the failure to create 25,000 jobs. At the present trade deficit level, the cost is about 3.7 million jobs.

High technology has been held out as the great hope for continued economic expansion in America. It may come as a shock to your committee then to learn, if you didn't already know, that America's trade deficit with Japan in electronics is $15 billion. It's even greater than the trade deficit in automobiles.

Now we are the first to acknowledge that a major portion of the trade deficit with Japan is not attributable to current unfair trade practices. A major portion of the deficit can be attributed to the fact that we do not manufacture color television and other popular consumer electronic products in the United States. These products are not manufactured in America because the Japanese have gained, at least in part through targeting those industries in the 1960's and 1970's, and in part to predatory pricing comparative advantages in the economics of producing consumer electronics. They can now produce better and more economically than we can.

As free traders, we believe in the theory of comparative advantage, but in technology-based industries Government intervention can distort comparative advantages and tip the balance in the direction of an industry favored by the Government. There are numerous ways in which Government can tilt the scales: tax policy, financing, permitting or encouraging cartels, and other monopolistic practices, including, as you have well observed, old-fashioned protectionism.

The Japanese have been tipping the scales in favor of technology based industries as a part of their national strategy. The time has come for American response. I'm not calling for a trade war. We're already losing the trade war. I'm not calling for protectionism or abandoning the theory of free trade. What I am calling for is a redress for past violations of the concepts of free trade by the Japanese and I'm calling for fair trade from the Japanese.

The first element of redress must be adoption as a key part of our national strategy of keeping America first in information technology. Semiconductors are the crude oil of the information age. Semiconductor technology has the same strategic importance to the information age that coal and petroleum had to the industrial age.

The health of our industry is currently threatened by Japanese practices and actions that tip the scales against us and unfairly hinder our ability to compete effectively.

In response to those practices, the Semiconductor Industry Association has filed an action under section 301 of the Trade Act of 1974 calling upon the President of the United States to take action against unfair practices by the Japanese. Specifically, our industry is seeking to redress two areas of injury, restricted access to the Japanese market, and predatory pricing practices by Japanese semiconductor manufacturers.

The immediate issue of our industry is unfair foreign trade practices. Even though there may be larger contributors to the trade balance, since our society does not tolerate looting at the scene of the disaster, why should we tolerate unfair trade practices that are injuring an industry that is vital to the United States of America? After a major earthquake or hurricane where damage runs in the millions, we don't tolerate someone stealing a television set just because it's only a television. We punish looters in an effort to stop looting.

The injuries to the semiconductor industry from predatory trade practices are real and they threaten both our economic vitality and our national security. The predatory pricing practices of the Japanese, coupled with their closed markets, are looting the American semiconductor industry. They are making it impossible to generate profits which if unchecked will make it impossible for us to invest adequately in both research and development and plant and equipment.

The impact upon our entire Nation's economic growth is incredibly far reaching. Ben Franklin was probably talking about us when he said, "A little neglect can breed great mischief." The Japanese trade offensive is aimed not merely at gaining market share but, more importantly, in gaining supremacy in all the critical product lines that drive semiconductor technology, and they have shown a willingness to engage in whatever practices are needed to gain market share in these technology drivers.

In D-RAM's, dynamic random access memories, the Japanese now have 70 percent of the market and it is predicted they will capture the entire remainder by the end of the decade. In S-RAM's they now have 80 percent of the market. In EPROM's, they now have 50 percent and have now targeted that sector; 25 percent of the worldwide IC market is in those three device types and these three product lines are the technology drivers, the high ground so to speak, in undeclared trade war. We cannot let our competitors capture all the high ground or the war will be lost for the American people, even though we were in it. It is vital to every one of us that we do not lose this battle.

Keeping America first in information technology is the key to preserving the American dream and handing it on to our children. It is clear that every American, not just every semiconductor company employee, has a stake in the outcome. The Congress has a major role to play in deciding the outcome because you shape public policy.

Public policy that increases the savings pool, encourage continued investment in research and development, and permit realistic depreciation of plant and equipment are all vital to our international competitiveness. The U.S. semiconductor industry as an industry which relies on international markets for 30 percent of its sales and which faces a rapidly increasing level of import competition in its domestic market, finds itself one of the industries most affected by any change in U.S. trade policy.

There are currently six elements of U.S. trade policy under review which should be considered in a comprehensive U.S. trade policy. These are bringing down the value of the U.S. dollar to appropriate level, vigorously enforcing U.S. unfair trade laws, negotiating elimination of foreign government barriers to imports, revising U.S. trade laws to address a wider range of unfair foreign trade practices, to provide compensation to parties injured by foreign unfair trade practices, and to enhance the international competitiveness of the U.S. industry, developing U.S. tax law that will enhance the international competitiveness of U.S. industry, and reexamining U.S. antitrust laws as they apply to foreign anticompetitive activities and U.S. competitiveness.

We must consider all these elements in our trade policy to ensure that we don't lose the opportunity to drive technology in the one remaining product sector where the United States is the real technology leader in EPROM's. If we lose the battle to remain first in information technology we hang up our hopes for a brighter future.

America's future is in high technology and our success or failure lies the Nation's ability to provide a safety net for the less fortunate, to assist the developing nations of the world, and to assure our own national security. The U.S. semiconductor industry welcomes competition. All we ask is fairplay. It is not fairplay when one of the competitors is given special assistance that enables it to walk off the playing field with all the advantages and it is permitted in the absence of any effective referees or penalties to violate the rules of the game. By the end of this decade we can have a Super Bowl between champions in information technology with advantages going to all mankind or we can have a contest between the Christians and the lions.

The U.S. Government can take steps now to ensure that it's the former. Thank you.

Senator WILSON. Thank you very much, Mr. Sanders.

[The prepared statement of Mr. Sanders follows:]

PREPARED STATEMENT OF W.J. SANDERS III

Mr. Chairman, my name is Jerry Sanders. I am Chairman, President and Chief Executive Officer of Advanced Micro Devices, a leading United States manufacturer of semiconductor products. I am also a member of the Board of Directors of the Semiconductor Industry Association (SIA), and today am testifying on behalf of that association. I wish to thank you for this opportunity to discuss with you and your committee some ways in which America can remain first in information technologies and to review the current trade situation in the semiconductor industry.

The question to address is: what is needed in order for there to be a U.S. semiconductor industry in ten years? Today I will outline the elements of a U.S. trade policy to accomplish that goal. I do not come here to engage in country bashing. I am here to promote America.

I. INTRODUCTION - AMERICA FIRST IN INFORMATION TECHNOLOGY

The information technologies are quite simply the core industries of the next industrial era, just as the steel, chemical, and automobile industries have been the core industries of the 20th century. It is critically important that the United States continue to lead the world in technological development and in the production of computers, communications products, software, instruments, robotics and semiconductors. These industries are essential to our national security, to our current economic well-being, and to our continued economic growth. Our competitors overseas have recognized the importance of these industries, and have engaged in a wide variety of programs to make possible their rapid growth. Very often, these foreign government promotional efforts have come at the expense of the United States industry involved. The United States Government must recognize that unless it takes prompt, affirmative action to ensure that America remains first in information technologies, other nations will usurp that position.

My mission here today is to champion the cause of keeping America first in information technology.

If America is the reigning but beleaguered champion, the challenger is Japan. The Japanese have set their sights on our precarious crown. They know that in this "Information Age," leadership in information technology equates to leadership in commerce. They also know that it is impossible to be first in information technology without also being first in semiconductor technology. This is why the Japanese have expended enormous sums of money over the past several decades in an effort to gain parity in semiconductor technology: it holds the key to supremacy in information technology.

The necessary U.S. effort to counter this challenge must involve not only the particular trade policies on which I will focus today, but a commitment to building technological skills and creating the environment in which those technological skills can be translated into the development and production of state-of-the-art information technology products.

II. THE NEED FOR A NEW U.S. TRADE POLICY

A new U.S. trade policy is necessary to make it possible for our information technology industries to survive the current challenge brought about largely by the industrial and trade policies of foreign governments. At the same time, a new U.S. economic policy is necessary to enable U.S. industry to stay in the lead in these areas. Government support for technical education, government encouragement of R&D expenditures, and government creation of an environment which encourages the commercial exploitation of products developed through domestic R&D are all required if U.S. information technology industries are not only to survive but are to maintain their economy-leading growth over the long term. Our challenge as an industry is to develop and present to our government suggestions as to the type of programs which can ensure that America is always first in technology.

Before I turn to the specific problems faced by the United States semiconductor industry in its international trade, particularly with Japan, I would like to examine the crucial elements of the overall U.S. international trade program which is emerging this fall through the interaction between the President and the Congress. The U.S. semiconductor industry, as an industry which relies on international markets for 30% of its sales and which faces a rapidly increasing level of import competition in its domestic market, finds itself one of the industries most effected by any change in U.S. trade policy.

There are essentially six elements of U.S. trade policy currently being implemented or under review in the U.S. government. These are:

- Bringing the value of the U.S. dollar to an appropriate level;
- Vigorously enforcing U.S. unfair trade laws;
- Negotiating the elimination of foreign government barriers to imports;
- Revising U.S. trade laws to address a wider range of unfair foreign trade practices, to provide compensation to parties injured by foreign unfair trade practices, and to enhance the international competitiveness of U.S. industry;
- Developing U.S. tax law that will enhance the international competitiveness of U.S. industry; and
- Reexamining U.S. antitrust laws as they apply to foreign anticompetitive activities and U.S. competitiveness.

Setting an Appropriate Value of the Dollar

The Administration's recent initiative, in conjunction with our major trading partners, to bring the value of the dollar back to an appropriate level with respect to other major currencies utilized in international trade, represents a very important step toward increasing the competitiveness of many U.S. industries. When the value of the U.S. dollar is inflated, this represents a tax on U.S. exports and a subsidy for imports. There is no clear, fundamental economic reason for the fact that the dollar has remained for such a sustained period at a level so unrelated to U.S. trade performance.

In fact, absent very strong investment flows from overseas, the excess of U.S. imports over U.S. exports should itself act to return the dollar to a balanced level. Such investment flows into the United States are, however, occurring. Thus, the concerted government action to realign exchange rates at a more realistic level is essential to put a halt to the devastation to key American industries which has been caused by the overvaluation of the dollar over an extended period.

Of course, this concerted government action must involve more than just temporary intervention in the exchange markets. The value of the dollar will only adjust if the markets believe fundamental change has occurred in the way the major trading partners have structured their economies. For the U.S. this means reducing the Federal budget deficit and lowering interest rates. For Japan, this means encouraging a higher level of individual consumption.

In any case, in and of itself, a currency realignment at a more realistic level will not be sufficient to reestablish the United States as the preeminent world industrial center or maintain our status as the world's leading technological center. Manufacturing jobs which were moved to other nations in order to avoid the penalty associated with production in the United States will not return to this country. Furthermore, in high technology industries such as ours, which is a target of national development strategies, and in which prices are already falling at a rate of approximately 30% per year, the value of the dollar has not proven to be a significant determinant of relative competitiveness.

Vigorously Enforce U.S. Trade Laws

The President has also indicated his commitment to the vigorous enforcement of U.S. trade laws. This step too is essential if U.S. companies are to avoid the terminal injury which can result from foreign government subsidies, foreign dumping of products in the U.S. market, and foreign barriers to access to their markets.

Yet, this step alone is also insufficient. Foreign unfair trade practices already include elements which fall outside of the scope of existing U.S. trade law, but which are nonetheless injurious to U.S. industries. Moreover, the trade laws provide no compensation to the U.S. industry which has suffered as a result of the foreign unfair practice. Furthermore, the application of the trade laws frequently cannot occur rapidly enough to avoid serious injury to the U.S. industry involved.

Eliminate Foreign Barriers To Imports

The President has also committed his Administration to take steps to eliminate foreign barriers to imports from the United States. This is particularly important in the case of emerging information technology industries which foreign governments may wish to protect from import competition. In the newer technologies which involve very large up-front R&D and investment expenditures, volume production is often the key to commercial success. When foreign markets are closed to U.S. companies, the U.S. companies lose not only the sales they would otherwise make in the foreign market, but sales that they are unable to make in their domestic market because their per unit costs are maintained at an artificially high level. At the same time, they lose many of the other benefits of volume production, such as improved production and design technology.

Foreign market barriers can take a variety of forms from quotas, tariffs and investment restrictions to non-tariff barriers such as customs delays and quality inspections to the encouragement by foreign governments of market structures and buy-national attitudes which prevent significant foreign entry into the market. In all these cases, the effects can be equally devastating, and the U.S. Government must be willing to take action against all such foreign market barriers.

Revise U.S. Trade Laws

One area of trade policy reform which the President has said must be addressed (though the Administration has not yet submitted any proposals), and which is under active consideration in the Congress, is trade law reform.

As mentioned above, there are types of foreign unfair trade practice now being experienced which are not clearly addressed under current U.S. unfair trade practice laws.

For instance, it should be made absolutely clear in our trade laws that U.S. companies are entitled to obtain relief from the ill effects of past foreign government actions and policies which continue to have a detrimental effect on the current trade patterns of U.S. companies. It should also be made clear that foreign government tolerance of an industry cartel is actionable under Section 301 of the Trade Act of 1974.

Furthermore, the Congress should enact legislation to permit domestic firms injured by foreign unfair trade practices to receive damages from their competitors in much the same way that antitrust damages are paid by the antitrust law violator to the injured party. At present, dumping and countervailing duties are paid directly to the United States Government.

In the early 1970s the U.S. industry was successful in proving that Japanese companies were dumping color television sets in the United States, but by the time duties were imposed to counter this predatory practice, the U.S. industry had already suffered irreversible damage and was eventually driven from color television production in this country. This was despite the fact that the dumping duties in this case were among the largest ever assessed.

The television case is illustrative of the frequent ineffectiveness of the duties imposed under our trade laws. It also demonstrates the need to ensure that actions to counter foreign unfair trade practices are carried through rapidly enough to provide timely relief to the effected U.S. industry. In the semiconductor industry, for instance, products have life cycles of as little as four years. As a result, in the two years between the recognition that unfair trade practices are occurring and the time that counter-actions are taken, the market for the product may well have become inconsequential. Changes to this aspect of U.S. law may require not only U.S., but international attention -- possibly during the upcoming round of GATT negotiations.

Finally, the U.S. Government should consider the competitive disadvantage imposed on U.S. information technology industries by our current system for the administration and enforcement of our export control laws. The current situation creates significant trade problems for U.S. exporters' long-time customers in friendly western countries. They find it very difficult to understand why we request such thorough documentation and audits when their other western suppliers do not. Furthermore, our competitors from our COCOM allies point out that U.S. companies are put at a competitive disadvantage by extraterritorial application of U.S. export control laws. It is far easier to do business with our COCOM allies who are restricted only by multilateral agreements. It is a matter of utmost urgency that we develop regulations that will allow us to do business on the same basis as our western competitors.

Tax Law is Trade Law

A growing number of Members of Congress are now recognizing that because U.S. tax policy has a very significant impact on the global competitiveness of U.S. companies, it too must be considered a form of trade law. Our tax system is "de facto" industrial policy, and at present it is encouraging the wrong types of U.S. industrial development. Borrowing is encouraged at the expense of saving, thus maintaining a higher U.S. cost of capital. At the same time, the highest effective tax rate is applied to the sector of our economy most affected by competition from abroad -- manufacturing.

The U.S. Government recognizes that tax reform is necessary. What is critically needed to make that reform effective from a trade and competitiveness perspective is to make a fundamental shift from a consumption-based tax system toward a savings-based tax system. Savings and investment are the lifeblood of our economy, and in particular of the information technology industries. Research and development, capital formation, and the prudent use of capital determine productivity growth, and ultimately, the standard of living of our citizens.

Our tax laws should reflect this fundamental fact. Yet the Treasury II tax proposal contains some provisions which are absolutely antithetical to the key issue of enhancing U.S. industrial competitiveness in information technology. Most seriously, the proposal would force U.S. information technology firms to depreciate their capital equipment at a very slow rate which is totally unrelated to the actual useful life of the equipment involved. Semiconductor manufacturing equipment, for instance, has a useful life of about four years and yet is classified in the same depreciation category as capital goods which have useful lives of twice that duration.

But of even greater concern to our industry is the Ways and Means Committee tax proposal which would impose a 20% penalty tax for R&D while cutting the R&D credit. Under this proposal, a semiconductor company which incurs a $100 million financial loss, but which performed $250 million in R&D during the year in which it experienced the loss (a realistic ratio for many semiconductor companies this year) would end up paying U.S. taxes.

These international competitiveness issues cannot be ignored (as they apparently were in the case of the Treasury II and Ways and Means tax proposals) in the preparation of our revised tax laws. To do so would risk completely offsetting the efforts being made in other areas of U.S. trade policy to revitalize U.S. industry's competitive strength on world markets.

Reexamine U.S. Antitrust Law

Finally, it is becoming apparent that the U.S. antitrust laws enacted around the turn of the century are based on an economic model which takes no account of international trade. Last year, the Congress wisely amended the antitrust laws to promote the creation of joint R&D ventures between U.S. companies. This law has already been widely utilized. Forty-five groups have already established or are now forming such ventures, including ten joint ventures in the electronics industry. It can be expected that the benefits of joint R&D will soon begin to be reflected in the marketplace.

SIA believes, however, that it is time to review our antitrust laws to consider possible ways in which they can be modified to reflect the new reality of a global marketplace and to improve the international competitive position of U.S. companies. We believe this can be accomplished without sacrificing the protection from anticompetitive behavior provided by the antitrust laws.

There are two areas of U.S. antitrust law which are most in need of review. One is the application of U.S. law to anticompetitive actions which take place outside of the United States. Where injury is done to U.S. companies by foreign actions or a foreign industry structure which would violate U.S. antitrust law, there should be some recourse under U.S. law. The other area to which consideration should be given is the possibility of permitting some joint manufacturing programs in the United States.

SIA will be conducting such a review during the coming months, and will hope to have the opportunity to work with the Congress in this process.

A Comprehensive U.S. Trade Policy

Out of these basic elements, the United States must formulate a comprehensive and effective trade policy. Each of the elements is critically important, but only if they are seen as parts of a whole will the overall policy be able to achieve its full potential. Our industry supports the conclusion of the President's Council on Industrial Competitiveness that the formation of such a trade policy must become a national priority. We also endorse the recent decision by the Administration to create a strike force on international trade issues under the leadership of Secretary of Commerce, Baldrige.

Only by taking that action can we avoid irrevocable damage to U.S. information technology industries in the short term and move onward to develop and implement the programs necessary to accelerate the growth of the information technology industries in the United States. SIA is anxious to work with you to develop concrete policy proposals, along the lines of those I have presented here today, which can form the basis which will permit us to proceed with our long term economic growth.

III. THE SEMICONDUCTOR TRADE SITUATION

I would like to turn now from broad policy issues and spend a few minutes reviewing the current status of international trade in the semiconductor industry. The concerns I have expressed regarding the danger of severe damage to our industry from unfair foreign competition are not at all academic.

In DRAMs -- dynamic random-access memories -- Japanese companies now have 70 percent of the world market and it appears they will capture virtually the entire remainder by the end of the decade. In SRAMs -- static random-access memories -- they now have 80 percent of the world market. And in EPROMs -- erasable programmable read-only memories -- they have more than 50 percent and have their sights set on the remainder.

These three product lines are the technology drivers -- the high ground, so to speak, in an undeclared trade war. We cannot let our competitors capture all of the high ground or the war will be lost before the American people even know we were in it.

As you know from the testimony given before this committee on this subject on August 6, 1985 by Charles Sporck, President of National Semiconductor Corporation and George Scalise, Chief Administrative Officer of my company, the Semiconductor Industry Association is actively pursuing a trade case under Section 301 of the Trade Act of 1974. In that case, the U.S. semiconductor industry seeks to obtain full participation in the Japanese semiconductor market (which has been denied to them by the actions of the Japanese government) and an end to semiconductor dumping by Japanese companies in the U.S. market. In addition, active investigations of the Japanese semiconductor industry are underway on two dumping charges, one private antitrust case, and one Justice Department antitrust investigation. The most recent of these is an antidumping petition filed on September 30, 1985 by my company along with Intel Corporation and National Semiconductor Corporation against Japanese manufacturers of EPROMs.

Clearly, the semiconductor trade situation which you are examining today has exploded into confrontation on a wide number of fronts. I firmly believe that there must be a better way to address the issues which have led to this confrontation. In fact, SIA and its member companies have strongly supported the efforts of the U.S. Government over the past fifteen years to resolve the trade issues raised in the semiconductor industry by unfair Japanese practices. Unfortunately, these negotiated efforts have resulted in a number of agreements which have either been actively undermined or simply not carried out by the Government of Japan.

I hold here a volume in which we document these practices. They include evidence of:

* The implementation by the Government of Japan of "liberalization countermeasures" which offset the benefits to U.S. companies of the elimination of Japan's semiconduc-

tor quotas and investment restrictions;

- Government of Japan financial assistance to its semiconductor industry since 1974; and
- Government of Japan "elevation programs" for its semiconductor industry which include very detailed technical targets set by the government for the development of new semiconductor products.

As you can see, this documentation is quite thorough.

Because other approaches have not resulted in the elimination of the ill effects caused by these practices, SIA and individual U.S. semiconductor firms, including my own, have found it necessary to bring formal trade cases. Through this process, we hope to bring about the prompt resolution of the semiconductor trade issues which have remained unsolved for so many years.

What we do not wish is to have our trade petitions distract the U.S. Government from the fundamental requirement that it represent the overall interests of U.S. commerce in resolving trade problems. I saw a news item in the Washington Post on October 1, 1985 in which it was reported that Houdaille Industries will cease to manufacture machine tools. This article was particularly relevant to our subject today, because in 1982 Houdaille brought a trade case seeking relief from allegedly subsidized and cartelized imports from Japan. Houdaille raised many serious competition questions which were never satisfactorily resolved, but eventually the relief was denied by the U.S. Government.

The result is that U.S. users of machine tools are now largely reliant on Japanese suppliers. This raises serious questions concerning the possibility that Japanese machine tool users will receive first priority when new products are brought out or when shortages occur.

I do not wish to read in the newspapers in a few years that the last American manufacturer of semiconductor devices is going out of business. Nor do our customers wish to read that news. Certainly, the parallel is not absolute. U.S. semiconductor companies have a stronger case than did Houdaille. Moreover, what we seek is access to the Japanese semiconductor market and an end to Japanese semiconductor dumping in our market. But in both situations -- Houdaille's and ours -- a U.S. industry has found itself competing with a heavily concentrated Japanese industry targeted for growth by the Japanese government.

There is also no reason I should have to read such an article. The SIA 301 case and our dumping petition provide overwhelming evidence of the unfair trade practices in which the Japanese government and Japanese semiconductor manufacturers have engaged. With regard to the market access issue, the U.S. Government has already concluded, in a 1983 submission to the U.S.-Japan High Technology Working Group, that U.S. semiconductor companies were not being permitted to achieve full participation in the Japanese marketplace. What is necessary is that the U.S. Government continue to focus on the fundamental trade problems which cause a case to be brought even after a case is initiated and then work to resolve those problems. An excessively legalistic approach to trade problems is not in the best interest of either our nation or of any of this nation's trading partners.

The semiconductor trade cases embody virtually every element of the Administration's current trade policy. We seek market access which has been denied to us by the actions of a foreign government, and we seek the enforcement of U.S. unfair trade practice laws. It is the intention of SIA that these trade cases combined with a new U.S. trade policy will finally make possible the permanent solution to our international trade problems with Japan and enable us to concentrate on the future development of our industry including healthy, fair competition with Japanese semiconductor manufacturers.

By the end of this decade we can either have a Super Bowl between champions in information technology with the benefits going to all mankind . . . or we can have a contest between the Christians and the lions. The U.S. Government can ensure that it is the former.

Mr. Chairman, I would request that the SIA documentation of Japanese unfair trade practices in the semiconductor industry "Japanese Protection and Promotion of the Semiconductor Industry" be entered into the record of this hearing. In conclusion, Mr. Chairman, I would like to complement you and this Committee for your attention to these issues of great importance to the United States, and thank you for the opportunity to appear before you today.

Senator **Wilson**. Mr. Amelio, do you have a statement that you wish to make?

Mr. **Amelio**. Senator Wilson, as you know, I do not have a formal statement. I would, with your permission, just add one or two comments if I might.

Senator **Wilson**. Please.

Mr. **Amelio**. I think, as stated eloquently by Mr. Sanders as well as Senator D'Amato earlier, that ultimately what we have here is a contest to see if America can compete in significant future world commercial markets. The future market is information technology and that, as we know, is fueled by semiconductor technology. We have a stake here. It's not just the $20 billion worldwide IC market, but a $400 billion worldwide information market which is growing rapidly.

The detractors today we know. Illegal trade practices by foreign governments, closed markets, macroeconomic factors, tax disincentives, and outmoded antitrust laws and lack of vigorous enforcement of our trade laws.

As for actions, we must begin somewhere, and we are advocating vigorous enforcement of our present trade laws and that's why we have appealed to section 301, but beyond that we have to review both our trade laws and our antitrust laws and enhance them where they are outdated.

We have to address the key economic factors such as our budget deficits, a tax policy for both incentives and disincentives so that we can encourage greater savings and capital formation, and discourage spending and overconsumption. And of course, we need a new productive round of GATT or the equivalent to encourage developed nations to carry their weight and effect a new reciprocity.

I am here today not only as a director of the SIA, along with Mr. Sanders, but also representing the Semiconductor Division of Rockwell International, as well as all of Rockwell, and we remain very concerned about these issues, not just today as we see with Japan and not just with semiconductors, but ultimately what the effect is beyond that in telecommunications and the implications in future trade relations with other nations.

So I stand behind Mr. Sanders' statement. Thank you for the opportunity, sir.

Senator **Wilson**. Thank you very much.

Mr. Wolff.

Mr. **Wolff**. If I might just mention a little bit of history for the record, we prepared a book entitled "Japanese Protection and Promotion of the Semiconductor Industry," which is solely Japanese source materials.[1] It's a bit like reliving history to read some of the documents that are in the Japanese press at the time.

On March 1, 1973, the United States Special Trade Representative, then Mr. Eberle, who came to Japan recently, notified our country if it does not decide to liberalize electronic computers and integrated circuits, the United States will lodge an appeal with the GATT. If the appeal is made, our country will inevitably be driven into a tight spot, and in this respect, too, it will be pressed to liberalize electronic computers urgently.

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[1] See appendix to this hearing for complete book of Japanese source materials.

Then MITI Minister Nakasone said:

> We're carefully checking into the time of liberalization and counter policies for it. Further tieup among the three groups of firms will be promoted. There can be no case of any of the groups withdrawing and MITI will give administrative guidance with the present three groups as the object.

He goes on to talk about the severe damage that would be done to Japan if liberalization is carried out, Japan must foster integrated circuit manufacturing at home because the integrated circuit is becoming the foundation for the electronic industry.

That began in March 1973. By June 1973, the MITI Minister Nakasone said, "In settlement of the dispute with the United States, in deciding the liberalization of electronic computers, the biggest pending question in the trade field between the United States and Japan has been removed. The pressure against Japan will probably lessen. Partly due to the fact that deliberations on the Trade Act will start in the United States, we decided to announce the liberalization of electronic computers quickly. In addition, due to appearing signs of a desirable imbalance of trade accounts between the United States and Japan, our deciding on the liberalization of computers and integrated circuits has removed the biggest pending problem in the United States-Japan trade. With this United States pressure against Japan will probably lessen." That was June 15, 1973.

I would just add one last note. On March 10, 1976, a few months later, MITI Minister sent two letters to local public organizations, financial organs, power industries, educational institutions and others and he said:

> The domestic computer industry must be fostered and developed by giving a fair evaluation of the technological standards of its products; that is [just in the case the point was lost on the recipients of the letter] if the Japanese model is on an equal level as a foreign model, the Japanese model should be selected.

That's the history of what we face today.

Senator **Wilson**. That's very enlightening and it's a very useful compendium and I'm grateful that you put it together.

Gentlemen, there is a vote underway. I can go and return very quickly. If your schedule permits, I would prefer to do that so that we can then proceed to questions. So we will take a brief recess and if you will just stay handy I will be right back.

[A short recess was taken at this point.]

Senator **Wilson**. Gentlemen, to resume, let me first invite Mr. Sanders and Mr. Amelio to make whatever comment they wish with regard to the whole line of questioning that I addressed to Mr. Prestowitz.

Mr. **Sanders**. I would love to respond to that. I wish I could have written the questions for you because if I had written them I would have written them the same way.

I think the situation exists today that the Japanese, through practices which go back several decades, have built a juggernaut in electronics which is not just in semiconductors but which is a juggernaut which can cross-subsidize semiconductors as appropriate.

As a result, the ability for the Japanese to compete in the areas where they have focused has become virtually insurmountable. Our concern now is to keep that from becoming terminal and wiping out the entire industry.

They already dominate virtually all of the technology drivers. Once they dominate all the technology drivers, then there is no hope for the industry because they will have insurmountable advantage.

So your questions about isn't it time we do something in retaliation, retaliation to me is the only thing. The Japanese, from my experience, only respect power. Asking them for favors seems to me an inappropriate thing to do inasmuch as we have given them free access to our market. They have closed their markets to us. They have an absolutely closed market, as you have heard from testimony. When they open the market through liberalization they use other techniques to keep the market closed.

At this point in time, the market is closed not merely by formal barriers which have been eliminated of course, but more by the fact that what can we sell them now? I mean, they have now set up internally the productive capability to make virtually everything they want. So the only thing we can sell them is what they don't make.

And as soon as we come up with a new idea of something they want to buy, they buy it until they can make it and then that market is closed to us.

So I'm quite sure what law they're breaking, but I know it's not in the U.S. interest and my frustration with the administration is that they are so preoccupied with the law that they don't understand the equity situation. The U.S. interests are being severely damaged and we're trying to find some method under current law to correct it. And I think that that may be a fruitless search.

Senator **Wilson**. You have certainly implied the answer to this, but if you would be even more specific, what are the long-term prospects for the United States semiconductor industry if it does not gain admission to the Japanese market, and if some of the tactics that are inhibiting competition in our own market are not corrected?

Mr. **Sanders**. Well, I have to say in answer to a question like that is always dangerous because we have to raise capital in the capital markets and if we say if we don't get some redress from Japanese unfair competition we are a terminal case, it is not enthusiastically received on Wall Street. But I think sometimes one has to rise above current stock prices and the impact on them and say, if the Japanese activities remain as they are unchecked there will be no United States semiconductor industry of importance within 10 years.

Senator **Wilson**. Now I assume that I know what your response would be, but make it for the record. Those who say that the decline of the U.S. industry is attributable to a lack of competitiveness or lack of keeping current in technology, a lack of being price competitive?

Mr. **Sanders**. Well, Senator, that's just absolutely nonsense. In the early 1970's when the United States companies had an infinitely superior productive capability and were not permitted to build plants in Japan or to access the market because they were protecting it, we had the comparative advantage and we were competitive.

Had they not protected their market then, we would have maintained that competitive edge.

The same thing is going on now in fiber optics. So we are competitive. It turns out we're not competitive in areas where they've already won and it's a little frustrating for us to continually apologize for the fact that their protectionism and their subsidies and their Government support has resulted in their domination in D-RAM's. But we accept mea culpa. They have won in D-RAM's. The reason they won is because of the same unfair practices which they are now applying to EPROM's.

Our only solution is we must stop them in EPROM's. They are not the technological leader in EPROM's. No Japanese company makes an EPROM for sale larger than 256,000 bits. Everybody capable of that are American companies. My company is the world leader with the only one mega-EPROM, but the market is small as it develops and unfolds. Meanwhile, their market of the older products use predatory pricing to drive me out of the business, removing my ability to generate R&D funds and capital investment funds.

The industry spent last year, just the top five companies in the semiconductor industry, spent $800 million of their own funds on research and development, $800 million. That's an enormous sum and it's 10 percent of sales. My company over the last 5 years has spent 17.5 percent of sales on R&D and still it's had the highest margins in the industry and is currently spending about $150 million a year. We are competitive. We have the world class products. That's what the Japanese buy from us. However, once they use these market penetration pricing tactics, they drive us out of the business, leaving us to a smaller and smaller corner of the market. We only have one technology driver left. When that's gone, I see very grim prospects for the industry.

Senator WILSON. Mr. Sanders, are the tactics which the Japanese are using that you have just described affecting your sales in other parts of the world? Tell me a little bit about the market worldwide.

Mr. SANDERS. Well, I'll give you an example. My largest customer in Japan bought approximately $20 million of our products last year. This year, while that customer expects to use 20-percent less semiconductors, our business has dropped by 60 percent. This is the direct result of them building more of it internally and price attrition.

So our business in Japan is the biggest decline of all of our businesses around the world, even though their market has held up better than the rest of the world market. My business is being impacted all over the world, again by predatory pricing. Prices have collapsed. Prices have come down 80 percent: 80-percent reduction in price in 9 months. Well, I can tell you since the area where the 80 percent price reductions occurred were an area which was 20 percent of my business, I'm immediately denied even a flat market 16 percent of the business. So the practices of predatory pricing to me are paramount in this issue and the closed market issue is important, but the predatory pricing and our ability to penetrate their market once the price has been driven down to unprofitable levels and below cost is of really secondary interest.

The real issue is how do we get the Japanese to price their products fairly rather than driving market share with a view to recouping profits and revenue later? When I speak generally to the Government, the administration, they say, "Well, what you're proposing will make your customers pay more money." My answer to that is, "They either pay more money now or they pay it later." Once there's no effective competition from the United States suppliers, then the prices will rise to whatever the traffic will bear and, in my view, that is not in the long-term best interests of this country before we even talk about national security.

So the impact has been that in 25 percent of the world market, which is commodity memories, Japanese pricing practices have eliminated the opportunity to make a profit. The top five United States producers of semiconductors are all reporting record losses on semiconductors.

Senator WILSON. In that respect, I would be grateful if you would provide for the record whatever figures the SIA has with respect to the market share which Japanese semiconductors have here and which United States semiconductors have in Japan.

Mr. SANDERS. We have that data, Senator. We will provide it to you through Alan Wolff.

[The following information was subsequently supplied for the record:]

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October 18, 1985

The Honorable Pete Wilson
United States Senate
720 Senate Hart Office Building
Washington, D.C. 20510

Dear Senator Wilson:

In the October 10 hearing you chaired of the Joint Economic Committee, Subcommittee on Trade, Productivity and Economic Growth, you requested that Mr. W.J. Sanders III, President of Advanced Micro Devices, provide you with additional information on the market share of Japanese firms in the United States and of U.S. firms in Japan. Mr. Sanders has asked that we provide you this information. The figures presented below are taken from the World Semiconductor Trade Statistics (WSTS) program. This program collects actual shipment figures to the North American, European, Japanese and Rest of the World Markets from semiconductor companies representing 95-98% of world semiconductor shipments. This is the best data base on semiconductor trade.

Market share figures from WSTS are not equivalent to official trade statistics. WSTS measures sales by national base of company rather than by country of export. Thus, products manufactured and sold in Japan by U.S.-based companies are counted as part of U.S. market share in Japan.

In calculating total market size, the WSTS program utilizes the total available market (TAM) concept. All shipments of commercially traded products are included as part of the market. If a company -- such as Motorola, Harris Corporation, NEC, Hitachi or Siemens -- utilizes some chips for its own end-use and sells others on the open market, that product is commercialy traded, and all shipments of that product are included in the market size figures. If, however, a company -- such as IBM -- manufactures semiconductors only for its own use and does not sell that product on the open market, the product is not included as part of the total available market. Such non-traded products cannot be considered part of the market because they generally embody trade secret packaging or other elements which make it impossible for any other company to supply a substitute product, and because, without a market price, it is impossible to put a market value on those chips.

The following are the 1982-1984 WSTS figures for U.S. companies market share in Japan and for Japanese market share in the U.S.:

Market Share Figures
1982-1984 -- Total Semiconductors
($ billion)

	1982	1983	1984	First Half 1985
Japanese Market	3.98	5.53	8.00	3.80
U.S.-based Cos. Sales in Japan	.40	.60	.91	.34
U.S. Market Share in Japan	10%	11%	11%	9%
U.S. Market	6.26	7.77	11.60	4.35
Japan-based Cos. Sales in U.S.	.65	1.00	1.66	.57
Japanese Market Share in U.S.	10%	13%	14%	13%*

* Japanese suppliers are most heavily concentrated in those semiconductor products which have experienced the most dramatic price declines (primarily memory products). This accounts for much of their 1985 decline in share in the U.S. market. As you know, two dumping cases have been filed in the memory chip area against the Japanese companies which caused these severe price declines.

Market Share Figures
1982-1984 -- Integrated Circuits
($ billion)

	1982	1983	1984	First Half 1985
Japanese Market	2.74	3.98	6.18	2.90
U.S.-based Cos. Sales in Japan	.35	.43	.85	.31
U.S. Market Share in Japan	13%	11%	14%	11%
U.S. Market	5.00	6.31	9.66	3.60
Japan-based Cos. Share in U.S.	.56	.88	1.50	.50
Japanese Market Share in U.S.	11%	14%	16%	14%

I hope this information is of use to you. If there is any additional information we can provide to you, please do not hesitate to contact me.

Sincerely yours,

Alan Wm. Wolff
Counsel
Semiconductor Industry
Association

cc: Ira Goldman
Ken Brown

Senator WILSON. Let me just ask this. Does your association in its policies deal with the question I asked Mr. Prestowitz as to whether or not our approach in terms of congressional legislation should be directed at the size of the trade deficit with Japan, or should it instead focus upon the level of our exports?

Mr. SANDERS. I'm unfamiliar with the current position of the SIA, so if I may I will respond as the chairman of Advanced Micro Devices and my understanding from my discussions with my colleagues without being fully aware of where the SIA is at this point.

We believe in promoting world trade. Therefore, we want the Japanese to buy more, not ship less. So we encourage market opening activities in some affirmative action format. When we use the term "affirmative action," what we mean is the only demonstration is an open market is increased procurement. It's not enough to have the sixth, the seventh, the eighth, the ninth Japan market opening initiative and then have them buy less, as they did last month, overall.

So what we want is some sort of affirmative action that they buy more, and the proof of an open market is that they buy more. They could have an import promotion program. They have had an export promotion program for 40 years. Maybe they could have an import promotion program on a sectoral basis where it serves U.S. interests.

Relative to Japanese exporting less through tariffs and the like, there are some benefits to that, but to me they are less direct and beneficial to our industry than the Japanese buying more.

Senator WILSON. How has the value of the dollar affected your industry in marketing?

Mr. SANDERS. Well, it turns out that whether the dollar is strong or weak versus the yen, we don't sell any more in Japan. It has no impact. Whether the dollar is weak or strong versus the yen, the Japanese price their products below our prices in this market. So frankly, it hasn't done a thing. The downward pressure on the dollar will have, in my view, virtually no impact on the U.S. semiconductor industry's business.

Senator WILSON. I would have to agree with that because I think that is the only inference that can be drawn from the flatness of the market share that has occurred over the past 20 years when the value of the dollar against the yen has varied enormously.

Mr. SANDERS. The only comment I would make, Senator, if I may—and I know that my colleague is anxious to make an additional comment here, so let me merely say that the objective of the Japanese semiconductor industry thrust is to drive us out of all the technology driver sectors so we are no longer competitive in technology and then all the propaganda that we aren't a competitive industry will be true. Once you've driven us out of the ways to stay competitive through predatory pricing and cross subsidy, we will then no longer be competitive, QED, and they have been working at it for 15 years and we are struggling, but they're getting real close. We have only a couple of years left before we would have to say to the committee, "We are no longer competitive."

Now I have to say with great chagrin, "We are no longer competitive in D-RAM's. We are no longer in S-RAM's." I can still say we are the world's leader in EPROM's, but I'm not sure I'll be able to say that to you in 24 months.

Senator **Wilson**. Thank you, Mr. Sanders.

Mr. Amelio.

Mr. **Amelio**. With respect to the earlier comments about world markets, I think the issue here is that in fact we realize that today the whole world economy is just that—it's a world economic situation. This Nation or any other nation can't any longer be an autarchy? We have to recognize that. In that sense, we businesses then become more dependent perhaps than ever before on the roles and policies of our Government. In some sense, they're a partner.

I think that is a very significant factor, not only for the short-term issues but for the long-term issues. I think we talk about the budget deficit, the overvaluation of the dollar and so forth. All of those things are important things that must be dealt with and on the long-term health of our economy and our country it's very, very important that we deal with all of those agenda items, but I think in the short term the actions have to focus clearly on the illegal trade practices that have brought us to this situation and the first thing we have to do is to stop the Japanese illegal trade practices and to indeed open up the markets.

There is only one nation in the world that can get Japan to act as a responsible world citizen and that's the United States. We just have to step up to the bar and make them act responsibly.

Mr. **Sanders**. I would like to second your comment that retaliation is the only thing we can have, so it can either be a retaliation if they don't do something which is a desired result—and certainly there have been proposals if they don't get the trade imbalance down to a certain level, the surcharges will be put on or tariffs, or we can just have a negotiated settlement. We in the semiconductor industry favor a negotiated settlement in our sector. We want to separate the issue of the overall trade deficit from the U.S. semiconductor industry trade deficit. The semiconductor industry trade deficit was $900 million last year with Japan. But, obviously this represents only a small portion of America's overall $60 billion trade deficit with Japan.

Nevertheless, if we are driven out of this business, we will not have a productive capacity to enable us even to maintain our defense establishment, which I think would be a terrifying thing for this country, and moreover, if we don't participate in the volume markets the semiconductor manufacturing equipment industry and the semiconductor manufacturing supply industry will also be lost to this country. And it would be a terrible thing if a critical strategic element—namely, the microchip—would have to be manufactured in foreign countries on foreign soil as a basic part of our national defense.

To that end, when the Japanese say, "Why don't you just build factories in our country so that you can be more competitive," we say, "Well, if that's the issue, why do you build factories in our country? If your factories are going to be competitive in our country, why can't our factories be competitive in our country? Are we inept? Are we incompetent?" And we would point out that the only company that was ever allowed to build factories in Japan, namely, Texas Instruments, has made no progress in market share in 10 years.

So we see yen values, where you build your factories, what you do, makes no difference. The fundamental issue is the Japanese market is inimicable to United States suppliers. The Japanese market is inimicable because the Japanese industrial strategy is worldwide domination of information technology and the only way they will move from that is under pressure of some alternative retaliation, retribution, or redress; and in that we support you 100 percent, Senator.

Senator **Wilson**. Mr. Sanders, I take it that you don't accept the argument that some make that United States exporters are not competitive with the Japanese competition because they don't supply adequate after the sale service either?

Mr. **Sanders**. It's not fair for me to be arrogant enough to say that applies across the board to all suppliers or it doesn't. I will only say that our service and supplies seem just fine when we have a unique innovative product and we seem to have a fine relationship with many customers in Japan until there is a Japanese source. Once there is a Japanese source, then any number of red herrings are thrown forth. So, no, I don't buy that.

I would like to use IBM as an example. I'm sure they don't need my advocacy, but I'll use them anyway. IBM's share of the market in Japan for computing equipment has declined from 60 percent to 25 percent in the last 15 years. They have dropped 25 percentage points of market share since 1980. They have gone from No. 1 to No. 3, falling behind Fujitsu and Hitachi in computing equipment in Japan and IBM has a world reknown reputation for and is acknowledged everywhere in the world as the finest after sale service company in the world.

If IBM cannot provide the service to win in Japan, who can?

Senator **Wilson**. Gentlemen, I think that you have really responded in your direct testimony to some of the other questions that I might ask. Your testimony has been very much to the point and it's been very useful and I thank you for being here. If there is anything that you care to supply in the way of statistical data in addition to the compendium which Mr. Wolff addressed earlier, we would be very grateful to receive it.

With that, I thank you, and this hearing is adjourned.

[Whereupon, at 12:05 p.m., the subcommittee adjourned, subject to the call of the Chair.]

APPENDIX

Japanese Protection and Promotion of the Semiconductor Industry

Japanese Laws, Government and Industry Documents, and Press Reports Relating to Japan's Promotion of its Semiconductor Industry, 1967-85

October 1985

Alan Wm. Wolff
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Preface

On July 11, 1985, U.S. Trade Representative Clayton Yeutter initiated an investigation into a trade complaint filed by the Semiconductor Industry Association (SIA).

SIA has been gathering data from Japanese sources on Japanese government protection and promotion of the semiconductor industry for a number of years. These materials, which include a significant number of translations of Japanese documents and press accounts, are being made available in this volume for the use of the Section 301 Committee and U.S. negotiators.

These materials, taken together, tell a story -- they describe how the Japanese government, in a period of less than two decades, has utilized subsidies, home market protection and a flexible antitrust policy to propel its semiconductor industry to its present highly competitive international position. It is a story which has been characterized by the implementation of "countermeasures" in conjunction with successive market "liberalizations," and the marshalling of national resources to achieve commercial objectives that were beyond the reach of individual firms.

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1. Law No. 84 of 1978, Law for Provisional Measures for the Promotion of Specific Machinery and Information Industries ("Kijoho") 1

   The Kijoho provided the statutory basis for Japanese government measures to promote designated information and machinery industries, including semiconductors through 1985. Enacted in 1978, it was the most recent in a succession of such laws. The Kijoho provides, among other things, for the authorization of "concerted acts" by producers in the designated industries.

2. MITI Machine and Information Industries Bureau, Trade and Industries Bureau, Commentary on the Law for Provincial Measures for the Promotion of Specific Machinery and Information Industries (1979) (portions translated) 12

   The 1979 MITI Commentary sets forth MITI's detailed plan for the "elevation" of designated industrial sectors, including the semiconductor industry. It establishes performance targets for specified device types, target dates for the achievement of those targets, and estimates of the budget which will be required. Certain device types (including VLSI integrated circuits) are designated for most preferential financing by the Japan Development Bank, and the mechanism for approval of these loans is described. With respect to semiconductors, MITI directs, among other things, that the semiconductor producers should establish a "cooperative regime with users."

3. MITI Machinery and Information Industries Bureau, Points of Emphasis in Policy Implementation for 1982 (February 1982) 60

   This internal MITI memorandum discusses competitive developments in the computer industry and the need for a government response, including subsidies and loans for critical activities and sectors. It

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places MITI's VLSI development program in context and offers an example of the Japanese government's attitude toward international competition in high technology.

4. Japan Information Processing Development Center (JIPDEC) Materials.........................71

JIPDEC is an organization founded, in its own words, "with the support of Government and related industrial circles" to promote information processing in Japan. It publishes JIPDEC Report and Computer White Paper, periodicals which, up until 1978, contained budget figures and other information concerning government subsidies to the semiconductor industry. Regrettably, JIPDEC no longer publishes such explicit and detailed subsidy data.

5. Japanese Press Clippings, 1967-85

This section consists of articles and translations of articles from 1967 to 1985 related to the development of the semiconductor industry.

The articles from the years 1971-76 are particularly noteworthy. They document the growing U.S. pressure on Japan to liberalize its computer and semiconductor industry, and Japan's urgent development and implementation of "liberalization countermeasures" designed to nullify the effect of liberalization.

The articles from 1984 and 1985 should also be noted. They document a major new effort by MITI to increase the magnitude of the tax breaks, "soft" government loans and other financial assistance to the microelectronics sector.

LAW NO. 84

(Translation)

The Extraordinary Measures Law for Development of Specific Machinery and Information Industries

(Law No. 84, July 1, 1978)

Article 1. Purposes.

The purposes of this law are to develop specific machinery and information industries by promoting, among other things, improvement of manufacturing technology and rationalization of production thereof, and thus to contribute to the sound development of the national economy and improvement of national living standards.

Article 2. Definitions.

(1) For the purposes of this law, "Electronic Machines and Tools" shall mean machines and tools applying the characteristics of electronic movements by using electronic tubes, semiconductor elements and/or other parts similar thereto and the parts and materials to be used mainly for such machines and tools.

(2) For the purposes of this law, "Machinery" shall mean machines and tools (except Electronic Machines and Tools) and the parts (including semi-finished goods; the same shall apply hereafter) to be used mainly for such machines and tools.

(3) For the purposes of this law, "Programs" shall mean the programs defined in Paragraph 2, Article 2, of the Law concerning Association of Businesses for Promotion of Information Processing, Etc. (Law No. 90, 1970).

Article 3. Advancement Plan.

(1) The Competent Minister must set up a plan concerning advancement (hereinafter the "Advancement Plan") with respect to the following industries (hereinafter the "Specific Machinery and Information Industries"):

(a) Of the industries which are engaged in the manufacture of Electronic Machines and Tools, the following industries:

(i) Those industries manufacturing such Electronic Machines and Tools specified by government order, the manufacturing technology of which has not yet been established in Japan and which especially require the promotion of experiment and research (including trial production; the same shall apply hereafter except for (2)(d) of this Article) concerning manufacturing technology thereof.

(ii) Those industries manufacturing such Electronic Machines and Tools specified by government order, the industrial production of which is not conducted in Japan or the production quantity of which is extremely small, and which especially require the promotion of the commencement of industrial production or increase of production quantity.

(iii) Those industries manufacturing such Electronic Machines and Tools specified by government order, which especially require the promotion of rationalization of production, such as improvement of performance or quality or reduction of production costs, etc.

(b) Of the industries which are engaged in the manufacture of Machinery, the following industries:

(i) Those industries manufacturing Machinery specified by government order, which especially requires the promotion of experimentation and research concerning manufacturing technology in order to prevent danger, to preserve the living environment, to rationalize use of resources, or to reinforce industries which manufacture such Machinery (hereinafter such purposes shall collectively be called the "Prevention of Danger, Etc.").

(ii) Those industries manufacturing Machinery specified by government order (limited to that Machinery (except for parts) which is combined with Electronic Machines and Tools, such as electronic computers, and as a result of the said combination has attained extremely high performance), which especially requires the promotion of the commencement of industrial production or increase of production quantity for the Prevention of Danger, Etc.

(iii) Those industries manufacturing Machinery specified by government order, which especially requires the promotion of rationalization of production, such as improvement of performance or quality, reduction of production costs, etc., for the Prevention of Danger, Etc.

(c) Software Industry (which means an industry preparing Programs according to the demand of others, expect for that which mainly prepares Programs for data processing in one line of business solely in response to the demand of persons engaged in such line of business; the same shall apply hereafter).

Matters to be set forth in the Advancement Plan are as follows:

(a) With respect to the industries described in (1)(a)(i) and (1)(b)(ii) of this Article, such matters as specified in (i), below, and, if necessary, such matters as specified in (ii) or (iii), below, which are fundamental for the promotion of the establishment of manufacturing technology:

(i) Content of the experiment and research and the target year of its completion.

(ii) Matters concerning funds necessary for the experiment and research.

(iii) Other important matters concerning promotion of the experiment and research.

(b) With respect to the industries described in (1)(a)(ii) and (1)(b)(ii) of this Article, such matters as specified in (i), below, and, if necessary, such matters as specified in (ii) through (iv), below, which are fundamental for the promotion of the commencement of industrial production or increase of production quantity.

(i) Target year of the commencement of industrial production or production quantity for the final target year.

(ii) Kind and number of facilities to be newly established.

(iii) Matters concerning funds necessary for the commencement of industrial production or for the increase of production quantity.

(iv) Other important matters concerning the promotion of the commencement of industrial production or increase of production quantity.

(c) With respect to the industries described in (1)(a)(iii) and (1)(b)(iii) of this Article, such matters as specified in (i), below, and, if necessary, such matters as specified in (ii) through (v), below, which are fundamental for the promotion of rationalization of production.

(i) Target of rationalization, such as target of performance or quality, production costs, etc., for the final target year.

(ii) Kind and number of facilities to be newly established.

(iii) Matters concerning proper scale of production introduction of cooperation of the business or specialization of the kinds to be produced.

(iv) Matters concerning funds necessary for rationalization.

(v) Other important matters concerning promotion of rationalization.

(d) With respect to the industry describe in (1)(c) of this Article, such matters as specified in (i) and (ii), below, and, if necessary, such matters as specified in (iii) through (v), below (excluding those pertaining solely to preparation of Programs for data processing in one line of business), which are fundamental for the promotion of improvement of technology and rationalization concerning preparation of Programs:

(i) Target of the experiment and research and target of other improvement of technology concerning preparation of Programs for the final target year.

(ii) Target of rationalization, such as preparation, costs of Programs, etc., for the final target year.

(iii) Matters concerning introduction of cooperation in the business.

(iv) Matters concerning funds necessary for improvement of technology or rationalization.

(v) Other important matters concerning the promotion of improvement of technology or rationalization.

(3) In setting up the Advancement Plan, the Competent Minister shall give attention to the mutual relationship among the Specific Machinery and Information Industries and give appropriate consideration to develop effectively the Specific Machinery and Information Industries pertaining to such Advancement Plan and other Specific Machinery and Information Industries which have close connection therewith.

(4) Promptly after the Advancement Plan has been set up pursuant to the provisions of (1) this Article, the Competent Minister must give notice thereof.

Article 4. Amendment of the Plan.

(1) The Competent Minister must amend the Advancement Plan in case he deems it especially necessary due to remarkable progress of the technology concerning the Specific Machinery and Information Industries or great changes of production conditions or other economic circumstances.

(2) The provisions of Article 3(3) and (4) shall apply *mutatis mutandis* to the case mentioned in (1) of this Article.

Article 5. Procurement of Funds.

The government shall make efforts to procure the necessary funds set forth in the Advancement Plan.

Article 6. Direction concerning Practice of Concerted Act.

(1) The Competent Minister may direct that persons engaged in the business of the industries described in Article 3(1)(a)(iii) or the industries described in Article 3(1)(b)(iii) (hereinafter such industries shall collectively be called the "Industries Requiring Rationalization") should practice concerted acts with respect to the restriction of standards or the restriction of technology, in case he deems it especially necessary in order to accomplish the target of rationalization set forth in the Advancement Plan concerning such industries.

(2) The Competent Minister may give direction that persons engaged in Industries Requiring Rationalization which may prevent sound development of the national economy unless rationalization of production is promoted should practice the concerted acts with respect to restriction of

kinds (except restriction of standards), or utilization of production facilities, in case he deems it necessary in order to accomplish the target of rationalization set forth in the Advancement Plan concerning such industries.

(3) In case it is difficult to accomplish the restriction of the standards of Electronic Machines and Tools provided by government order set forth in Article 3(1)(a)(iii) or the Machinery provided by government order set forth in Article 3 (1)(b)(iii) (hereinafter collectively the "Machines and Tools Requiring Rationalization") solely by means of the concerted acts with respect to the restriction of standards provided in (1) of this Article, the Competent Minister may give direction that the persons who are engaged in the business of manufacturing Electronic Machines and Tools or Machinery (excluding the Industries Requiring Rationalization; the same shall apply hereafter) by using the Machines and Tools Requiring Rationalization as parts or raw materials should practice the concerted acts with respect to the restriction of standards of Machines and Tools Requiring Rationalization to be used by them, if he deems it especially necessary. However, such direction may not be given in case it is not acknowledged that such concerted acts will contribute to the rationalization of such industries which manufacture the Machines and Tools or Machinery by using the Machines and Tools Requiring Rationalization as parts or raw materials.

(4) The directions provided for in (1), (2) and (3) of this Article shall be given by notice, specifying the period during which the concerted acts are to be practiced and the content thereof.

Article 7. Content of the Concerted Acts.

The content of the concerted acts provided for in (1) through (3) of Article 6 must conform to the following conditions:

(a) Not to exceed the level necessary to accomplish the target of rationalization set forth in the Advancement Plan.

(b) Not to threaten to deprive unduly general consumers and relevant entrepreneurs of their interests.

(c) Not to be unduly discriminating.

Article 8. Alteration of Direction as to Concerted Acts, Etc.

(1) The Competent Minister must alter or withdraw his direction when he deems that the content of the concerted acts allowed by the direction pursuant to the provisions of Article 6(1) through (3) no longer conforms to any of the conditions set forth in the previous Article.

(2) The provisions of Article 6(4) shall apply *mutatis mutandis* to the case mentioned in (1) of this Article.

Article 9. Notification of Concerted Acts.

The person who receives direction provided in Article 6(1) through (3) (or in case such direction is altered pursuant to Article 8(1), such altered direction; the same shall apply hereinafter) must file the notification with the Competent Minister of the matters set forth in the order of such Minister promptly after he practices a concerted act in accordance with such direction. The same shall apply in case of alteration or abolition thereof.

Article 10. Order Concerning Restriction of Standards.

The Competent Minister may, by order of such Minister, order that a person who is engaged in the Industires Requiring Rationalization and has received a direction to practice the concerted acts with respect to the restriction of standards pursuant to the provisions of Article 6(1) should restrict the standards of the Machines and Tools Requiring Rationalization in accordance with such direction in the event that:

(a) the production quantity of such Machines and Tools Requiring Rationalization of the persons who are practicing the concerted acts in accordance with such direction covers a considerable proportion of the aggregate production quantity of such Machines and Tools Requiring Rationalization.

(b) the business operation of the persons who are engaged in the Industries Requiring Rationalization covered by such direction and are not practicing the concerted acts significantly prevents the accomplishment of the target of rationalization set forth in the Advancement Plan concerning such business.

(c) It is impossible or extremely difficult to accomplish the restriction of the standards of such Machines and Tools Requiring Rationalization by means of the direction provided in Article 6(3).

(d) It is acknowledged that the continuation of such conditions as described in (b) of this Article shall threaten adversely to affect the improvement of the production method of such Industries Requiring Rationalization and the sound development of the national economy to a significant extent.

Article 11. Exception to Applicability of the Act.

The provisions of the Act Concerning Prohibition of Private Monopoly and Maintenance of Fair Trade (Law No. 54 of 1947) shall not be applied to the concerted acts practiced pursuant to the direction provided for in Article 6(1) through (3), except as practiced by means of Unfair Business Practices.

Article 12. Relationship with Fair Trade Commission.

(1) The Competent Minister must previously consult with the Fair Trade Commission when he intends to give the direction pursuant to Article 6(1) through (3) or the order pursuant to Article 10.

(2) When the Competent Minister receives the notification set forth in Article 9, he shall promptly inform the Fair Trade Commission of receipt.

Article 13. Recommendation.

(1) In case the Competent Minister acknowledges that persons engaged in the Industries Requiring Rationalization or Software Industry whose production quantity of the Machines and Tools Requiring Rationalization or Programs covers a considerable proportion of the aggregate production quantity of such products of those engaged in the same industries are practicing the introduction of cooperation in the business (in case of the Industries Requiring Rationalization, the introduction of cooperation in the business or specialization of kinds to be produced (hereinafter such introduction of cooperation and specialization shall collectively be called the "Reformation"), in accordance with the Advancement Plan applicable to such business, and that the commencement or extension (both in large scale) of such business by other persons threatens to adversely affect the practice of such Reformation and the sound development of the national economy to a significant extent, he may recommend such persons attempting such commencement or extension of the business either to participate in such Reformation or to change the timing of such commencement or extension or the scale of the business.

(2) The content of the recommendation provided for in (1) of this Article may not be restrictive beyond the extent required to accomplish the target of the rationalization indicated in the Advancement Plan applicable to such business, and may not threaten to unduly deprive general consumers and relevant entrepreneurs of their interests.

(3) The Competent Minister must provide such persons attempting such commencement or extension of the business with a previous opportunity to state their opinion when he gives the recommendation in accordance with (1) of this Article.

Article 14. Taxation Measures

The Government shall make efforts to take necessary taxation measures for the persons who use such Electronic Machines and Tools as provided by government order under Article 3(1)(a)(ii) (limited to those Electronic Machines and Tools (except for parts and materials) that are combined with other Electronic Machines and Tools, such as electronic computers, and as a result of the said combination have attained extremely high performance) or such Machinery as provided by government order under Article 3(1)(b)(ii) which especially requires dissemination.

Article 15. Inquiry to the Council.

(1) The Competent Minister must make an inquiry to the Airplane and Machinery Industries Council in case he intends any of the following acts:

(a) To make out a draft for the establishment, amendment or abolition of the government order set forth in Article 3(1)(a)(i), (ii) or (iii), or Article 3(1)(b)(i), (ii) or (iii).

(b) To set up the Advancement Plan pursuant to Article 3(1), or to amend the Advancement Plan pursuant to Article 4(1).

(c) To give a direction set forth in Article 6(1) through (3), order in Article 10 or recommendation in Article 13(1).

(2) In case the Advancement Plan set forth in (1)(b) of this Article relates to the Software Industry, the Competent Minister must consult such matter with the head of the relevant administrative organ.

Article 16. Receipt of Reports.

Pursuant to the government order, the Competent Minister may require a report concerning business or accounting conditions of a person engaged either in the Specific Machinery and Information Industries or in the business of manufacturing Electronic Machines and Tools or Machinery using as parts or materials the Machines and Tools Requiring Rationalization to the extent required for the enforcement of this Law.

Article 17. The Competent Ministers.

For the purposes of this law, the Competent Minister means the Minister of International Trade and Industry with respect to the matters concerning the industries manufacturing Electronic Machines and Tools specified by government order under Article 3(1)(a)(i), (ii) or (iii) and Software Industry and the Minister responsible for production of each Machinery with respect to the matters concerning the industries manufacturing Machinery specified by the government order under Article 3(1)(b)(i), (ii) or (iii).

Article 18. Punishment.

A person who has breached an order set forth in Article 10 shall be punished with a fine of not more than ¥500,000.

Article 19. Punishment.

A person who falls under either of the following items shall be punished with a fine of not more than ¥100,000:

(a) A person who has failed to file a notification in accordance with Article 9, or filed a notification containing a false description.

(b) A person who has failed to report in accordance with Article 16, or filed a report containing a false description.

Article 20. Punishment.

In case a representative of a corporation, or an agent, an employee or other person acting on behalf of a corporation or an individual has committed any of the acts stated in the preceding two Articles, such corporation or individual shall also be punished pursuant to such Articles as well as such committing person.

MITI
COMMENTARY ON
LAW NO. 84

Excerpts from Commentary on Public Law 84, Law for Provisional Measures for the Promotion of Designated Machine and Information Industries ("Kijoho") by MITI Machine and Information Bureau, Trade and Industry Research Group (Japanese Government Publication, SIA translation)

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Article 11. Exception to Applicability of the Act.

Summary

This section defines the relationship between the designated cartel based on this act and the Antitrust Act.

Commentary

The Antitrust Act attempts to realize its ultimate goal, the "improvement of the benefit of consumers through competition in efficiency" by "securing free, fair and rational competition." In order to attain this goal, the Antitrust Act prohibits the "private monopoly" and "unfair restrictions on trade" (Section 3 of the Act) so that the conditions of competition can be recovered or maintained. In addition, it regulates "unfair trading methods," that is, irregular means of competition (Section 19 of the Act).

If persons engaged in the machine industry take joint actions such as limiting of specifications and others in accordance with the instructions based on the stipulations of Section 6, Subsections 1-3 of this act, naturally they "restrict [(in practice?)] practically the competition in a certain trade area." This is in conflict with the stipulations of the Antitrust Act that prohibits the "private monopoly" and the "unfair restrictions on trade." The present stipulation of this act is provided so that this conflict can be avoided and that the consistency of the legal system can be maintained. By this stipulation, the illegality of the joint action based on the stipulations [(provisions?)] of this act is blocked and discarded.

However, such a joint action with which the illegality of the Antitrust Act is blocked and discarded by the stipulation of this sentence of this Section may be found in conflict with Section 19 of the Antitrust Act if the participants of the joint resort to "unfair trading methods" as means for securing agreement related to the joint action or as means for carrying out what has been agreed upon. (Provision)

Incidentally, the "unfair trading method" has been defined in the Antitrust Act, Section 2, Subsection 9. It is an action which belongs to one of the following 6 categories specifically designated by the Fair Trade Practice Commission as an act which could hinder fair competition. (Notification No. 11 of the Fair Trade Practice Commission issued on September 1, 1953)

(1) Unequal treatment

(2) Unfair counter pricing

(3) Forced trading

(4) Binding conditions

(5) Abuse of superior position

(6) Obstructing trading of the competitors or unfair forcing of the shareholders or officers of the competing firms.

* * *

Article 14. Taxation Measures

Summary

This section stipulates the need of efforts to take necessary taxation measures with respect to some of the machines and instruments used as components to form systems in case when the propagation of such are considered to be urgent need.

Commentary

I. Preferential tax measures on component type machines and instrument

As we have already stated in the commentary on Section 3, the main current of the advancement of the machine industry in the future will take a course on creating more secure supply system of the component type machines and instruments as the results of high degree of combinations of computers and other electronic products with other machines and instruments in such a manner that machine, electronic and information technology, can be integrated to realize in concrete forms the remarkable technological revolutions in hard and soft sides.

Based on this concept, this act pays sufficient attention to the designation of machines and the planning for technological advancement. In addition, a problem in propagating these componentified machines and instruments, which are functionally excellent, has not been overlooked in this act. Extremely high purchase prices of these components could hinder the propagation. To solve this problem, this act stipulates the effort to extend tax preferential measures to users of the machines and instruments which are considered to require special propagation efforts.

II. Machines to which this stipulation is applied

Because the aim of the tax measures is to promote the increasing use of component type machines and instrument and thus to establish a secure supply system for them, the machines to which this stipulation is applied to are limited to the electronic apparatus specified in the ordinances referred to in Section 3, Subsection 1, Paragraph 1, (b) which have acquired markedly higher performances as the results of their combination with computers or other electronic apparatus, or the machines specified in the ordinances referred to in the Paragraph 2, (b) of the same subsection. (Both categories are so-called industrialization promoting machines.)

(Reference)

III. Following measures, realized by the amendments of the Special Tax Measure Act in 1978, are tax measures related to this section which have been taken

A. The special Tax Measure Act Section 11 (Income Tax) and Section 43 (Corporation Tax) with respect to the special depreciation of specified facilities, etc.

A person using for his business the machine or other facility as a set of electronic data processing devices and industrial machines newly developed or markedly improved to perform advanced degrees of functions when used in combination, provided that the production of the set requires a large sum of expense to build and that the installation of such a set is specified by ordinances as urgent and necessary.

B. The special Tax Measure Act Enforcement Ordinance Section 6 (Income Tax) (Similar stipulation is also found in Section 28 (Corporation Tax).)

Those specified by the ordinances referred to in the Act Section 11, Subsection 1, Table ?, Paragraph 6 are machines or other facilities as sets of data processing devices and industrial machines indicated by the Minister of

Finance to be markedly effective in improving the processing precision or processing speed, or markedly effective in promoting the safety at work steps.

C. 1973 Ministry of Finance, Announcement No. 69, Attached Table 6

Chapter III Administration of the Temporary Measures Act for the Promotion of Certain Machine and Information Industries

Section 1. Target Industries for the Promotion

As the name of this act, The Temporary Measures Act for the Promotion of Certain Machine and Information Industries indicates, this act can be applied to "certain machine and information industries." In conformity with the Act, Article 3, Clause 1, only certain electronic apparatus and machine manufacturing industries and software industries designated in a government ordinance can be the "certain machine and information industries." The basic philosophy underlying the Act is that even though the ultimate objective is to contribute to healthy development of the national economy and also to the improvement of living standards by elevating the entire machine and information industries in Japan, it is not necessary to take up all of the machine and information industries as candidates for the promotion measures of this Act, but the promotion measures should be limited only to those which will meet rapidly increasing new national economic and social demands of recent times.

This Act, as in the case of the "Kiden-ho," establishes different conditions for machines and electronic apparatus respectively in designating as "specific industries" in a government ordinance. As for machines, only those that contribute to the prevention of danger can be designated by the government ordinance.

The electronic industry is a so-called advanced technology industry which is experiencing worldwide intense technological innovations. With electronic apparatus used in every production area and process, they are a basis for the future development of the national economy and particularly they are a precondition the development of systematized and informationalized industries. For these reasons, to promote the electronic industry is in itself to respond to the needs in the economy. Therefore, with respect to electronic apparatus, targets for the promotion are not limited only to those electronic apparatus to meet specific demands such as the prevention of pollution and the establishment of safety, but targets can be any apparatus necessary for the development of technology, industrialization and the rationalization of production.

On the other hand, as results of various measures taken since 1956 including the "Kishin-ho" and "Kiden-ho" among others, machine industries with the exception of a few have attained rather high standards in their technology and production capabilities. What is needed more in this area for the future in the form of Government's policies for the promotion is to provide appropriate assistance so that the machine industry can smoothly supply pollution prevention machines, safety machines, resource conservation machines and others in response to rapidly increasing social demands of increasing years such as demands for solutions to pollution and safety problems and the conservation of energy and resources. From this viewpoint, as stipulated in Article 3, Clause 1, Item 2 of this Act, the target apparatus designated in the Act with respect to machines are only those apparatus recognized as particularly helpful to promote and research, industrialization or rationalization of production in one of the following areas: (1) prevention of danger, (2) preservation of living environments, (3) efficient utilization of resources, and (4) strengthing the foundation of machine manufacturing enterprises.

Differences as to target industries for the promotion in this Act from those in the "Kiden-ho" are as follows:

1. the software industry was added to the legal industries

2. the statement "to contribute to the application of new technology on a commercial basis, the conservation of energy, and the improvement in styles of business activities" was eliminated from and "to contribute to efficient utilization of resources" was added to the conditions for designating machines in a government ordinance.

3. In the area of machines, only compound types of apparatus can be designated in a government ordinance as the apparatus to promote industrialization.

Based on the basic philosophy stated above, regulations for the enforcement of the Temporary Measures Act for the Promotion of Certain Machine and Information Industries have designated types of industries. The numbers of electronic apparatus and machines designated in the government ordinance are as follows:

1. Electronic apparatus

a. those that are faced with particular needs to facilitate testing and research on their production technology	15
b. those with particular needs to begin industrial production or to increase their production volume	8
c. those with particular needs to rationalize their production	9

2. Machines

a.	those with particular needs to facilitate testing and research on their production technology	20
b.	those with need particularly to begin industrial production or to increase their production volume	4
c.	those with particular needs to facilitate the rationalization of production	32

With the addition of the software industry legally designated to those listed above, the number of target industries for the promotion in this Act toals 89.

The numbers of apparatus designated in this Act and those in the "Kiden-ho" are compared in the Table 2. [Translation omitted.] And the characteristics of the designation in this Act are as follows:

1. Compound types of apparatus have been newly designated.

In response to a spreading tendency of social demands for compound types of apparatus, compound apparatus such as computers combined with other electronic apparatus or machines have been newly designated.

(Examples) high performance facsimile store and forward switching device, numerically controlled automatic forging equipment, high performance computer controlled automatic designing device.

2. Characteristics in the area of electronic apparatus.

    a. Relatively speaking, many of them are at the testing and research phase and at the phase industrialization.

    b. Especially at the testing and research phase, the emphasis has continuously been placed on various materials for electronic apparatus which are keys to the improvement in quality and performance of the entire machine industry including electronic apparatus and to the technical innovation in the future.

    c. With respect to industrial meters and instrumentation related to pollution, mechnical types have been predominant in the past, but electronic types are considered to become predominant in the future due to the rapid progress in electronics. Therefore, in this area testing and research to be promoted will be limited to electronic apparatus types.

3. Characteristics in the area of machines.

   a. Relatively speaking, many of the target machines are at the stage of rationalization, but this Machine and Information Act can designate those machines at the phase of promoting industrialization if they are compound apparatus. The Act includes four of this type.

   b. Those kinds of apparatus that contribute merely to the reduction of manpower (for example, vending machines, automatic cashiers and automatic ticketing machines in the "Kidenho") are excluded. Heating, cooling, and hot water boiler equipment which use solar energy, high performance waste recycling equipment and light water nuclear reactors are included for the first time because they contribute to efficient utilization of resources including energy.

For your information, the apparatus to promote the rationalization of machines in relation to designation criteria such as the prevention of dangers are listed in the following. Naturally some of the apparatus fall under more than one criterion.

* * *

Section 2. Elevation Plans

I. Significance and nature of the Elevation Plans

The competent Minister must lay down plans concerning elevation (hereafter referred as "elevation plans") of industries that manufacture apparatus designated by the government ordinance and the software industry. (Article 3, Clause 1)

The Machine and Information Act ("Kijo-ho") enacts, as in the case of the "Kiden-ho," measures according to actual conditions of target industries such as instructions for joint acts, recommendations for how to initiate a large-scale business, how to secure funds, and tax measures. These measures, however, are interrelated and they will attain the desired objective only when they are implemented systematically on the basis of coherent and unified plans. Therefore, by making and announcing plans for each industry to systematically achieve these measures, the government shows the future course and necessary steps to be followed by the machine and information industries. These are important guidelines to private industries and at the same time they exhibit the overall system of policies by the government for the electronic and machine industries and the software industry.

Although elevation plans are made and announced by the competent Minister, they are, in a sense, joint plans between the public and private sectors because the Aircraft-Machinery Industry Council must be consulted with at the time of plan formation and also opinions of concerned industries must be carefully listened to at the actual planning stage of proposals. For this reason, elevation plans are not a mere document describing prospects, but they show ambitious visions pointing out the desirable direction for the machine and information industries to take. They also provide the basis for carrying out policies and for organizing measures based on the Act.

In addition, this Act emphasizes that the competent Minister must pay attention to interrelations among and between the specific machine and information industries in determining elevation plans and also he must give consideration so that certain machine and information industries covered by the said elevation plans and other certain machine and information industries closely related to them will be effectively promoted. (Article 3, Clause 3) The reason why this point is emphasized is because while the "Kiden-ho" provided special consideration to the promotion of the creation of systems and compound types by combining the "machine" and the "electronic apparatus," for the future not only this trend but the unification of "machines, electronics and information" are considered necessary. In other words, the elevation of programs on the use of compound equipment must be taken into consideration. In addition, due to the fact that there are organic interrelations among and between industries engaged in electronic materials, parts and assembly, due consideration must be given to the necessity to create elevation plans the contents of which reflect sufficiently this mutual interrelationship.

The competent Minister must revise elevation plans in case the existing elevation plans become not suitable due to extreme changes in economic conditions. (Article 4)

* * *

Chapter III

Section 3. Subsidies

I. Loans for investment in plants and equipment

As stated previously, special financial funds with special interest rates (electronics, machine industry elevation funds) set aside in Japan Development Bank and Small Business Finance Corporation will be made available for loans to those industries designated in this legislation. The purpose of the loans is to provide necessary equipment funds to achieve objectives such as to begin industrial production or to increase production output, to improve product performance or quality, or to decrease production costs as prescribed in the elevation plans for the apparatus to enhance industrialization and rationalization, thus, smoothly propelling the elevation of the said industries.

The outline of the loan system for equipment funds to the specified electronics and machine industries is as follows:

A. Prospective industries for loans

Businesses that manufacture the electronic apparatus stipulated in Article 1, Paragraphs 2 and 3 of the regulations for the enforcement (Government ordinance number 84 of 1978) for the Temporary Measure Act to Promote Specific Machine and Information Industries, and similarly those businesses that manufacture those machines stipulated in Article 2, Paragraphs 2 and 3.

B. Financial institutions that accommodate loans

1. Small Business Finance Corporation

Loans will be accommodated by the Small Business Finace Corporation provided that business plans submitted for the loans have to do with such small businesses as stipulated in Article 2 (Company with capital of ¥100 million or less, or company with 30 employees or less) of the Small Business Finance Corporation and that the total amount does not exceed a certain amount (¥220 million for the year of 1979) by adding their existing loan balance (including general loans) at the Small Business Finace Corporation and their recommended amount for elevation loan in the said year.

2. Japan Development Bank

Japan Development Bank will accommodate loans in case business plan submitted for such loans do not meet the terms of the Small Business Finance Corporation.

C. Terms of the loans.

(Those listed here are applicable for 1979. Loan interest rates are as of June 1, 1979.)

1. Small Business Finance Corporation

(Approximately ¥5.5 billion out of ¥74 billion earmarked for modernization loans. The ceiling is not definitely determined)

Loan methods:

Direct Loans and Agency Loans

Loan limits:

Direct loans--¥220 million combined with general loans

Agency loans--¥30 million aside from general loans

Loan interest rates:

a. Most preferential special interest rate: 6.65%. However, 7.15% after the fourth year.

----applicable to the apparatus to promote industrialization and a portion of the apparatus to promote rationalization of electronic apparatus.

b. Special interest rate: 7.65%

----applicable to the apparatus to promote rationalization of electronic apparatus (excluding (a)) and a part of the apparatus to promote rationalization of machines.

c. Regular interest rate: 7.7%

----applicable to the apparatus to promote rationalization of machines (excluding (b)).

The table 5 shows applicable interest rates by apparatus. (The same classification applies for loans to be accommodated by Japan Development Bank.)

Loan maturity:

10 years or less

Grace period:

two years or less

2. Japan Development Bank (Total amount ¥-11 billion)

Loan limits:

50% of the total equipment and construction cost.

Loan interest rates:

a. Most preferential special interest rate: 6.65%

----applicable to the apparatus to promote industrialization and a portion of the apparatus promote rationalization of electronic apparatus.

b. Special interest rate: 7.65%

----applicable to the apparatus to promote rationalization of electronic apparatus (excluding (a and a portion of the apparatus to promote rationalization of machines.

c. Regular interest rate: 7.7%

----applicable to the apparatus to promote rationalization of machines (except (b)).

Loan maturity:

longer than 5 years but less than 10 years with 7 years as the standard.

Grace period:

approximately 1 year.

D. Procedures for loan application

Special loans for funds for equipment investment from Japan Development Bank and Small Business Finance Corporation in conformity with the Machine and Information Act are made on the basis of recommendations by the Ministry of International Trade and Industry. For this purpose, in May and June of every year (it was December for 1978 due to legislative schedules) the MITI Machinery and Information Industries Bureau announces in the MITI Bulletin items necessary to receive loan recommendations (date and address to send application for loan recommendation, documents to be submitted with the application, etc.) at the same time it begins to accept applications publicly from corporations through various trade and industry bureaus and pertinent industry groups and organizations.

The MITI, then, after hearing from applicant corporations the explanation as to the contents of their investment plans to examine whether or not their proposed works are essential to achieve the targets for production volume increase, improvement in product quality and performance and rationalization of production costs as prescribed in elevation plans, and also to judge whether or not their proposed plans are necessary to achieve appropriate production scales, work collaboration, specialization, and other items for rationalization, selects qualified corporations and makes recommendations for loans to Japan Development Bank or Small Business Finance Corporation.

Based on the recommendations by MITI, financial institutions concerned will examine applicants' capabilities to repay such loans before special loans created by this Act are provided.

The application procedure stated above is schematically illustrated in the Chart 3.

II. Preferential tax measures for important compound machines

In lieu of the combined tax system used during the time of the Electronic and Machine Industries Act, the Machine and Information Industries Act, from the point of view to accelerate the availability of apparatus for compound machinery and to attempt indirectly to promote the apparatus manufacturing industry, has established a special depreciation system for important compound machines.

This system allows special depreciation in the first year up to one-fourth of the acquisition value of the important compound machines which are those that come to possess extremely high performance by compounding electronic information processing equipment primarily composed of electronic apparatus or machines and electronic computers. (Special Taxation Measures Law, Articles 11 and 43; Regulations for the enforcement of the above Law, Articles 6 and 28)

[Reference]

(1) Special Taxation Measures Law, Article 11

(2) Special Taxation Measures Law, Article 43

(3) Regulation for the enforcement, Article 6

(4) Regulation for the enforcement, Article 28

III. Measures to supplement credit standing in accordance with the Small Business Credit Insurance Law

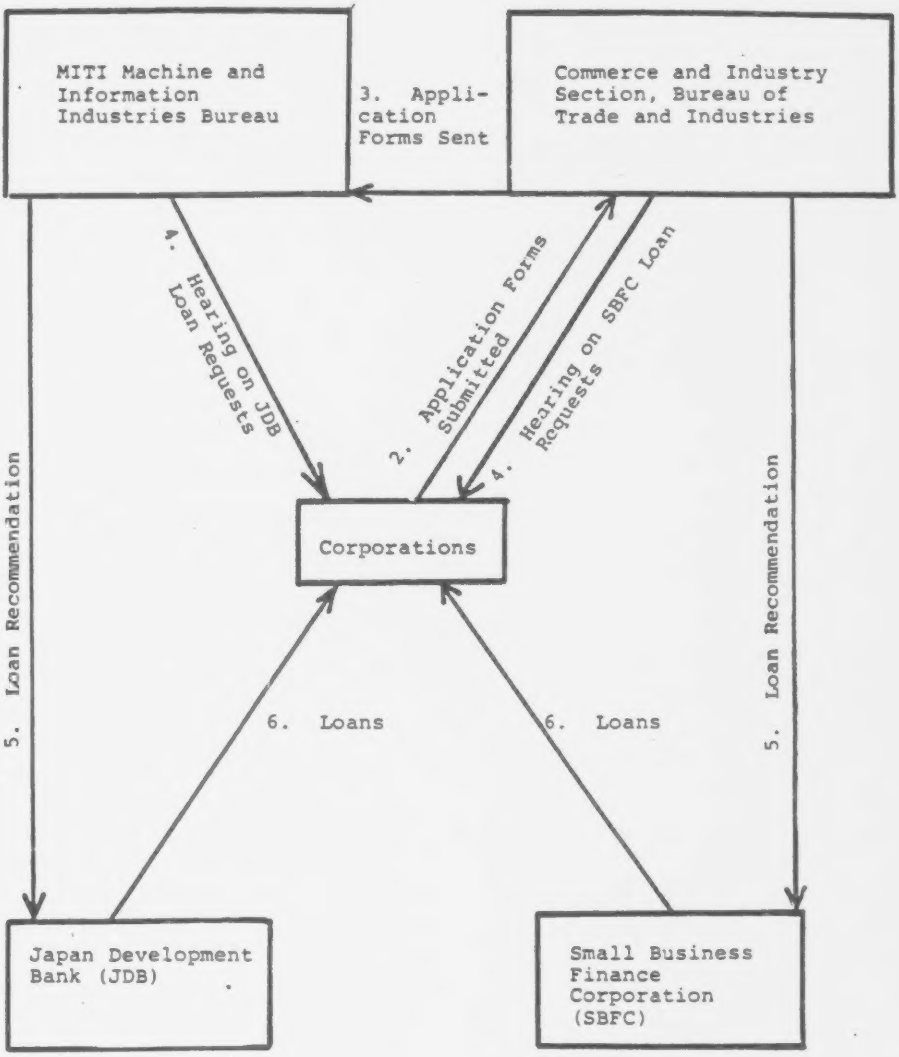
It is authorized to apply modernization insurance established in the Small Business Credit Insurance Law to enterprises that manufacture apparatus to promote rationalization of machinery and those that manufacture apparatus defined as electronic apparatus in the Machinery and Information Industries Act.

This means that when the credit guaranty association guarantees obligations for loans from financial institutions by small businesses that fall into these categories, the Small Business Credit Insurance Corporation can conclude an insurance contract for modernization with the said credit guarantee association. In this case, the loans which will be covered are limited to equipment funds necessary for the acquisition machines and equipment and their incidental facilities that need to be newly installed in accordance with the elevation plans, and their related long-term operation funds.

* * *

PROCEDURES FOR LOAN APPLICATIONS -- JAPAN DEVELOPMENT BANK AND SMALL BUSINESS FINANCE CORPORATION

1. Public Announcement of the Outline for Loan Recommendations.


MITI Machine and Information Industries Bureau
3. Application Forms Sent
Commerce and Industry Section, Bureau of Trade and Industries
4. Hearing on JDB Loan Requests
2. Application Forms Submitted
4. Hearing on SBFC Loan Requests
5. Loan Recommendation
Corporations
6. Loans
6. Loans
5. Loan Recommendation
Japan Development Bank (JDB)
Small Business Finance Corporation (SBFC)

Source: MITI Machine and Information Industries Bureau, Commentary on Public Law 84

(Chart 3)

Table 5. List of interest rates applicable to apparatus qualified for loans.

A. The following electronic apparatus and parts and materials mainly used for the electronics apparatus (apparatus to promote industrialization)

** 1. High performance facsimile store and forward switching equipment.

** 2. Electronic digital computers and their peripheral and terminal equipment that possess capabilities suitable for high degrees of remote information processing.

** 3. Magnetic cartridge mass storage devices.

** 4. Magnetic bubble storage devices.

** 5. Compound semiconductor elements (red emission elements excluded).

** 6. Semiconductor ICs (limited to MOS ICs with 100,000 or more elements and bipolar ICs with 5,000 or more elements).

** 7. Liquid crystal display cells (limited to dot matrix type).

** 8. Materials for electronic apparatus.

   a. Compound semiconductor materials (limited to those with gallium and phosphorus as principal ingredients).

   b. Rare earths cobalt magnetic materials.

B. The following electronic apparatus and parts and materials primarily used for them (apparatus to promote rationalization)

* 1. Electronic applied apparatus for medical use.

* 2. Electronic exchange devices.

* 3. Facsimile equipment.

---

* Special interest rate (7.7%).
** Most favored interest rate (6.65%)

** 4. Electronic digital computers and their peripheral and terminal equipment.

* Special interest rate (7.7%)

** 5. Magnetic recording media

  a. Magnetic tapes for measuring devices and electronic computers.

  b. Flexible discs.

* 6. ICs

** 7. IC parts and its facility parts

  a. Compound IC parts,

  b. Surface elastic wave used filters,

  c. connectors,

  d. multi-layer print wiring boards.

* 8. Piezoelectric ceramic elements.

* 9. Materials for electronic apparatus

  a. High purity silicon,

  b. Ferrite products.

C. The following machines and parts and semi-finished goods for parts primarily used for the machines (apparatus to promote industrialization).

** 1. Numerically controlled metal machine tools (limited to those with high precision positioning capability by means of feedback control).

** 2. Numerically controlled automatic forging equipment.

** 3. Industrial robots (limited to those with five degree or better operation freedom, high precision positioning capability, and more than four arms each of which is capable of different movement, and intelligent robots.)

** 4. High performance computer operated automatic design equipment.

---

* Special interest rate (7.7%)
** Most favored interest rate (6.65%)

D. The following machines and parts and semi-finished goods for parts primarily used for the machines (apparatus to promote rationalization)

* 1. Light water nuclear reactors.

* 2. Numerically controlled metal machine tools.

* 3. Forging and press machinery

   a. Liquid press,

   b. mechanical press,

   c. cutting machine,

   d. forging machine.

* 4. Conveyance equipment

   a. crane,

   b. conveyor,

   c. hoist,

   d. elevator.

5. Industrial robots.

* 6. Pumps, compressors, and fans.

7. Heat exchangers.

8. Freezing and air-conditioning equipment and hot water boiler and heating equipment

   a. package type air conditioner,

   b. freezer unit for refrigerator cars,

   c. show case for frozen foods (limited to those cooled by refrigerator),

   d. fan coil unit and air handling unit,

   e. hot water and heating boiler,

   f. heating, air conditioning, and hot water boiler equipment run by solar energy.

---

* Special interest rate (7.7%).

* 9. Textile machines and sawing machines
  - a. spinning machine,
  - b. thread finishing and processing machine
  - c. looms,
  - d. dyeing and finishing machine,
  - e. industrial sawing machine.

* 10. Construction machines
  - a. dry gravel breaking machine,
  - b. power shovel,
  - c. truck crane,
  - d. tractor.

* 11. Farming tractors.

* 12. Food processing machines
  - a. baking machine,
  - b. meat processing machine.

* 13. Pulp manufacturing machines and paper manufacturing machines.

* 14. Paper processing machines, printing machines, type-founding machines and binding machines.

* 15. Plastic product manufacturing machines
  - a. automatic injection molding machine,
  - b. automatic extrusion molding machine.

* 16. Lumber processing machines.

* 17. Automatic casting equipment.

* 18. Automatic packaging machines and automatic packing machines.

19. Precision measuring apparatus.

---

* Special interest rate (7.7%).

20. Meters and inspection apparatus for automotives.
* 21. Gas leak alarms.
22. Pollution preventive equipment
    a. exhaust gas equipment,
    b. dust collecting equipment,
    c. waste water treatment equipment,
    d. waste treatment equipment.
23. Rolling stock
    a. chopper operated cars,
    b. light weight cars.
24. Special steel screws.
25. Ball bearings and roller bearings
26. Mechanical tools
    a. artificial grinding whetstones,
    b. special steel tools,
    c. cemented carbide tools
    d. machine blades
27. Hydraulic machinery and air pneumatic machinery
    a. hydraulic pumps,
    b. hydraulic motors,
    c. hydraulic cylinders,
    d. hydraulic valves,
    e. hydraulic accumulators,
    f. air pneumatic cylinders,
    g. air pneumatic valves,
    h. fluid elements.
28. Valves
    a. automatic control valves,

   b. high temperature and high pressure valves,
   c. cryogenic valves.

29. Automotive parts
    a. combustion equipment,
    b. exhaust gas purificatio*n
    c. brake gears,
    d. electric devices,
    e. lights,
    f. power transmissions,
    g. steerinq double gears,
    h. suspension safety devices,
    i. noise prevention devices,
    j. seat-belt style passenger restraining devices.
30. Cast items
    a. precision cast items,
    b. large-sized cast iron items,
    c. large-size aluminum alloy cast items.
31. Plastic processed metal goods
    a. precision forged goods,
    b. precision press products.
32. Powder metallurgic products
    a. sintered and forged items,
    b. large-size powder metallurgic products.

Table 6. 1973 Ministry of Finance, Announcement No. 69

Machines and other facilities	Period
High performance computer-controlled metal processing machines (limited to those which have their own dedicated electronic computers (limited to those digital type computer with more than 6 MB of main memory (excluding testing bits)) with the minimum read unit of 0.005 mm for detecting the position of the object of the operation, with the capability of precise position control by feedback of the position detection data to the computer. Application is limited to the cases where the metal processing machine and the computer are installed at the same time. This category includes the I/O devices installed at the same time.)	April 1, 1978 to March 31, 1981
High performance computer-controlled automatic design equipment (limited to those with automatic design correcting function, standard material-selecting function and function to represent any desired cross section having their own dedicated computers (digital) with more than 25 MB main memory (excluding memory capacity bits) and automatic drawing machine (limited to those with more than one square meter of effective drawing area, a pulse width of 0.02 mm or smaller, and maximum drawing speed of one meter second, and more than four kinds of drawing pends). Application is limited to the cases where they are installed at the same time. This category includes the I/O devices, memory devices, control devices or electric power source devices installed at the same time.	The same as the above.
High performance computer-controlled facsimile accumulator-exchange devices (limited to those which perform smooth transmission and reception between facsimile machines of different speed, control of simultaneous transmission through multiple communication path, selection of alternative communication-	April 1, 1978 to March 31, 1981

transmission path, selection of the communications based on content preference with their own dedicated computer (digital type computers with more than 6 MB main memory (minus testing bits). Application is limited to the cases where the exchanges (limited to those whose exchange circuits connected are more than 20), storage device (limited to those dedicated to the exchanges, having more than 50 MB of memory capacity (excluding testing bits)), and computers are installed at the same time. This category includes attached electric devices installed at the same time.	
High performance computer-controlled automatic forging equipment (limited to those which perform the shearing, transporting, heating, and forging of materials controlled by the use of the dedicated computers (digital computers with a main memory of 6 MB or over (excluding testing bits)). Application is limited to the cases where the forging press (limited to those with the maximum pressureapplying capacity of 1,200 tons or over. They should be either die-forging type with quick metal die exchanging function or the free forging type which are capable of detecting the position of the object of the operation, detecting the temperature of the material, and feeding these obtained data back to the computer to subsequently control the pressure level precisely) and computers are installed at the same time. This category includes attached shearing device, transporting devices which are used after the shearing step, material heating device, quick metal die exchanging devices, I/O devices and electric power source equipment for the computers.	April 1, 1979 to March 31, 1982
High performance data remote processing apparatuses (limited to those which have remote batch processing function, on-line real-time processing function and time-sharing processing function which owns dedicated computers (digital computers with a main memory of 800 MB or over (excluding testing bits) and virtual memory function) and intelligent	April 1, 1979 to March 31, 1982

terminals (limited to those which have arithmetic operation unit and logical operation unit). Application is limited to the cases where these are installed at the same time. This category includes the attached I/0 devices, memory devices, communication control devices and electric power source equipment which are installed at the same time.

REFERENCE MATERIALS

SPECIFIC MACHINERY TYPES DESIGNATED FOR ELEVATION

[Full description follows for selected items]

	Page
1. Electronic apparatus -- apparatus for testing and research advancement	
(1) Electronic instruments for measuring electricity	
(2) High performance radiation measuring instruments	
(3) Electronic apparatus for medical purposes	
(4) Electronic industrial meters	
(5) High performance electronic instruments for measuring density	
(6) Communications devices	
(7) Electronic apparatus for aircraft	
(8) Supersonic (wave-using) equipment	
(9) Electronic digital computers and their peripheral and terminal devices that are of high performance	46
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(11) Electronic tubes	
(12) Semiconductor elements	49
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(14) Circuit parts and mechanical parts	
(15) Materials for use in electronic apparatus	
2. Electronic apparatus -- Apparatus for industrialization	
(1) High performance facsimile accumulation and exchange devices	
(2) Electronic digital computers and their peripheral and terminal devices that possess functions suitable for advanced remote information processing	51

(3) Large capacity magnetic cartridge memory devices 52

(4) Magnetic bubble memory devices 52

(5) Compound semiconductor elements 53

(6) Semiconductor ICs (limited to the MOS type ICs with more than 100,000 elements and the bi-polar type ICs with more than 5,000 elements) 54

(7) Liquid crystal cells (limited to the dot matrix method) 56

(8) Materials for use in electronic apparatus 57

3. Electronic apparatus--apparatus for rationalization

(1) Medical electronics

(2) Electronic exchangers

(3) Facsimile equipment

(4) Electronic digital computers and their peripheral and terminal devices

(5) Magnetic recording media

(6) ICs 57

(7) Circuit parts and mechanical parts

(8) Piezoelectric ceramic elements

(9) Materials for use in electronic apparatus

4. Machinery--Apparatus for testing and research advancement

(1) Numerically controlled metal machine tools

(2) Forging and pressing machinery

(3) Industrial robots

(4) High performance automatic assembly equipment

(5) Chemical machines

(6) Dyeing and finishing machines

(7) High performance offshore oil rigs

(8) Large-scale injection molding machine for thermosetting resin

(9) High performance fiberboard production lines

(10) Combustion furnace with low level nitrogen oxide emission

(11) Testing equipment

(12) Pollution prevention equipment

(13) Magnetically levitated rolling stock

(14) Cars and automotive parts

(15) High performance cooling, heating, hot water boiler equipment run by solar energy

(16) Cutting tools and rolling tools

(17) High performance hydraulic equipment

(18) Cast items

(19) Compound processed metal items

(20) Powder metallurgical products

5. Machinery--Apparatus for Industrialization

(1) Numerically controlled metal machine tools (limited to those that can perform high precision positioning by feedback control)

(2) Numerically controlled automatic forging equipment

(3) Industrial robots (limited to those with higher than five degree movement freedom, high precision positioning capability, and more than four arms, each of which can perform a different movement, and to intelligent robots.)

(4) High performance computer controlled automatic design equipment

6. Machinery -- Apparatus for Rationalization

(1) Light water nuclear reactors

(2) Numerically controlled metal machine tools

(3) Forging and pressing machines

(4) Conveyor equipment

(5) Industrial robots

(6) Pumps, condensers and fans

(7) Heat exchangers

(8) Refrigerating and cooling equipment and hot water boiler and heating equipment

(10) Industrial sawing machines

(11) Civil engineering machines

(12) Farming tractors

(13) Food processing machines

(14) Pulp manufacturing machines and paper-making machines

(15) Paper processing machines, printing machines, type-founding machines and book-binding machines

(16) Plastic product manufacturing machines

(17) Lumber processing machines

(18) Automatic casting equipment

(19) Automatic packaging machines and automatic packing machines

(20) Precision measuring equipment

(21) Measuring and inspection devices for cars

(22) Gas leak alarms for residential use

(23) Gas leak alarms for industrial use

(24) Pollution preventive devices

(25) Waste water treatment equipment for boats and ships

(26) Rolling stock

(27) Special steel screws

(28) Ball bearings and roller bearings

(29) Artificial grinders

(30) Special steel tools and cemented carbide tools

(31) Machine blades

(32) Hydraulic devices and pneumatic devices

(33) Valves

(34) Automotive parts

(35) Cast items

(36) Plastic processed metal products

(37) Powder metallurgical products

7. Software industry

REFERENCE MATERIALS, ITEM 1:
OUTLINE OF ELEVATION PLANS BY TARGET BUSINESSES

1. **Electronic Apparatus -- Apparatus for Testing and Research Advancement**

   (9) **Electronic digital computers and their peripheral and equipment that are of high performance.**

      I. With respect to general digital computers with the following capabilities, their manufacturing technology is to be established by constructing, for example, experimental models. [1984] [450,000] [Capability-cost ratio should surpass the standard of foreign-made equipment planned in the same target year.]

         A. To package LSIs (larger than one million bit memory elements, larger than 10,000 gate logic elements, or equivalent technology. The same applies hereinafter) in main frames. [Basic technology shall be established by 1979.]

         B. Package density shall be improved by increasing the number of layers and the density of wire boards.

         C. The effective fault rate in logic circuits shall be less than one fit per gate.

         D. Shall possess functions such as automatic diagnosis, automatic correction of mistakes, automatic retrials and automatic reconfiguration and materialize a high operating ratio.

         E. The micro program type shall be able to release its programs to users.

         F. Shall possess hierarchical memory configuration that includes large capacity files.

         G. Shall possess the following operation systems

            1. Control programs with advanced and highly reliable control functions such as one level storage control, multi-channel virtual memory system, and dense combination and scarce combination multiprocessor system.

NOTE: [Year] [Amount] indicates the target year and the fund required in million yen.

2. Data base control systems that can handle a variety of data.

3. Virtual computer control programs that can simultaneously handle plural operating systems.

4. High standard language processors capable of programming in natural languages, simplified language processors for easy programming, and special language processors that can process voice, charts, images and Chinese characters.

5. Converters and emulators that will make transfer from existing systems easy.

II. With respect to mini-computers with the following functions, their manufacturing technology shall be established by building, for example, experimental models [1984] [50,000] [The performance-cost ratio should surpass the standard of foreign-made mini-computers in the project target year.]

A. The effective fault rate in logic circuits should be less than one fit per gate and LSIs should be packaged.

B. The effective fault rate in the main memory equipment should be less than one fit per gate, the user should be able to enlarge capacity by means of unit modules.

C. The micro program type should be able to release its programs to the user.

D. Should possess the following operating systems.

1. Control programs that possess advanced control functions and can respond to a variety of inputs and outputs.

2. Micro program assembers and micro programming methods that can be released to the user.

3. High standard language processors.

4. Emulators that will make both the use of special purpose computers and the transfer from existing systems easy.

III. With respect to office computers with the following capabilities, their manufacturing technolology established by building, for example, experimental models [1984] [100,000.] [The capability cost ratio shall surpass the stanard of foreign-made office computers planned in the target year.]

A. The effective fault rate in logic circuits shall less than one fit per gate, and LSIs shall be packaged.

B. Microprogram types shall be able to release their programs to the user.

C. Shall possess the following operating systems.

 1. Control program with advanced control functions such as continuous job processing, multi-channel processing, a variety of data input and output, and data base control.

 2. High standard language processor and simplified language processor for easy programming.

IV. With respect to the following peripheral and terminal equipment, their manufacturing technology shall be established by building, for example, experimental models [1984] [200,000]

A. Quiescing type file system with capacity of more than 10 megabytes.

B. Sealed type magnetic disc memory system with memory capacity of larger than 50 megabytes, memory density of larger than 500 bits per millimeter and the average registration time of less than 50 milliseconds.

C. Magnetic drum storage or fixed head magnetic disk memory with memory capacity of more than 200 megabytes, memory density of larger than 300 bits per millimeter, and the average access time of less than three millisecond.

D. Magnetic disc memory with memory capacity of more than 1,000 megabytes, memory density of 500 bits per millimeter, and the average registration time of less than 20 milliseconds.

E. Flexible disc memory with memory density of more than 500 bits per millimeter and memory capacity of more than 4 megabytes.

F. Magnetic tape memory with memory density of more than 480 bits per millimeter and transfer speed of more than 2,400 kilobytes per second.

G. Low priced large capacity storage system with memory capacity of more than two billion bytes and on-line access capability.

H. Mass storage unit with memory capacity of more than 30 billion bytes.

I. Optical disc memory system that uses optical technology and possesses memory capability of more than 1,000 megabytes.

J. Pen controlled type high speed plotter with resolution of less than 0.01 millimeter and plotting speed of more than one meter per second.

K. Pen controlled type high precision plotter with resolution of less than 5 micrometers and plotting speed of more than 50 centimeters per second.

L. High performance CRT character display devices that can display more than 200 kinds of letters and more than 4,000 letters on the screen.

M. Character display devices that use elements other than CRT, can display more than 128 kinds of letters, and more than 1,000 letters on the screen.

(12) Semiconductor elements

I. With respect to the following electronic apparatus, their manufacturing technology shall be established by, for example, experimental production.

A. High performance silicon semiconductor elements

1. The following high frequency transistors. [1982][350]

a. HF transistors with continuous output of 50 watts or more when the frequency is 4 giga-hertz, and those with continuous output of 100 watts or more when the frequency is 2 giga-hertz.

b. HF transistors with pulse output of 700 watts or more when the frequency is 2 giga-hertz, and those with pulse output of 200 watts or more when the frequency is 4 giga-hertz.

2. Low frequency transistors with collector voltage of 400 volts or more and collector electric current of 600 amperes or more, as well. [1982][300]

3. Large capacity and high speed switching diodes with current capacity of 15 amperes or more and the reverse recovery time of 50 nanoseconds or less. [1982][300]

4. High speed switching reverse conducting flow cylisters with reverse pressure resistance of 5,000 volts or more, current capacity of 1,000 amperes or more, and the turn off time of 30 microseconds or less, as well. [1982][300]

5. HF cylisters with reverse pressure resistance of 2,000 volts or more, current capacity of 600 amperes or more, and, in addition, the turn-off time of 8 microseconds or less. [1982][300]

B. High performance compound semiconductor elements

1. Blue emitting elements with wave length of 4,350 Angstrom (A) or more but of 500 Angstrom or less, external quantum of 5% or more, and, in addition, drive voltage of 3.5 volts or less. [1982][250]

2. Red emitting elements with external quantum effect of 10% or higher. [1982][150]

(13) ICs

I. With respect to the following electronic apparatus, their manufacturing technology shall be established by, for example, trial production.

A. LSIs

1. Bipolar ICs with integration of 50,000 elements or more per chip. [1982][3,000]

2. MOS ICs with integration of 2 million elements or more per chip [1984][3,000]

B. Low power driven ICs

1. MOS ICs that consume electricity in the amount of 0.04 microwatts or less per row of flip-flop.

C. High speed ICs

1. High speed ICs with electric consumption of 0.5 milliwatts or less per gate, propagation delay time of one nanosecond or less, and, in addition, integration of 16,000 gates or more per chip. [1984][1,500]

2. High speed ICs with electric consumption of 0.5 milliwatts or less and also propagation delay time of 0.1 nanosecond or less. [1984][1,200]

D. High power high pressure resistance ICs

1. Semiconductor ICs with the output of 50 watts or more. [1984][1,500]

2. Semiconductor ICs with pressure resistance of 500 volts or more. [1984][500]

2. Electronic Apparatus -- Apparatus for industrialization

(2) Digital Computers and Their Peripheral Equipment Which Are Capable Of Remote Information Processing

I. 1984 Production goal for the following items with performance levels as specified below is equivalent to 100 units of the digital computer.

A. Digital Computer

1. Those digital computers with a main memory of U.5 M or over, having virtual memory function and communication control function.

2. Those having operating systems with instant transaction process controlling function, efective controlling function in the multichannel timeshare processing, dynamic file assigning function, and other functions suitable for the highly advanced remote information processing.

B. Peripheral Terminal Devices

Those digital computers whose terminal devices have batch-processing function and other independent [smart?] information processing functions.

II. Kinds of Facilities and Funds

A. Automatic designing device (5 billion yen)

B. Automatic production device (10 billion yen)

C. Automatic testing device (5 billion yen)

III. Others

Efforts shall be made for developing minicomputers with highly advanced remote data processing capability.

(3) Large Capacity Magnetic Cartridge Memory Device

I. Target year for the start of the industrial production and the production quantity for the target year.

A. The industrial production of large capacity magnetic cartridge memory device (those with memory capacity of 2B or over, transmission spread of 1M/sec or over and 10 seconds or shorter access time) shall be started 1980, and projected to reach 600 units/year of production level in 1984.

II. Kinds of facilities and Funds

A. Production facilities.

1. Mechanism manufacturing facilities (2 billion yen)

2. Head manufacturing facilities (1 billion yen)

3. Circuit manufacturing facilities (1 billion yen)

B. Testing facilities

1. Testing facilities for the device itself (1.5 billion yen)

2. Facilities for comprehensive test (0.5 billion yen)

(4) Magnetic Bubble Memory Device

I. Production Proposed for 1984

A. Proposed production of magnetic bubble memory device those with magnetic bubbles of bubble diameter of 1.5 micromillimeters or smaller, transmission rate of 100 K/sec and access time of 3 millisecond and shorter) is 5,000 units

II. Kinds of Facilities and Funds

- A. Production facilities
    1. Air-purifying room and air-purifying facility (2 billion yen)
    2. Membrane forming, manufacturing facility (2.4 billion yen)
    3. Chip-cutter-related facilities (0.8 billion yen)
    4. Photolithography-related facilities (2 billion yen)
    5. Micropattern mask forming manufacturing facilities (2 billion yen)
    6. Chip observation related facilities (1.2 billion yen)
    7. Module testing facilities (1.6 billion yen)
- B. Testing facilities
    1. Wafer testing facility (2 billion yen
    2. Chip testing facility (2 billion yen)
    3. Module testing facility (2 billion yen)

(5) Chemical Compound Semiconductor Element

I. Production proposed for 1984

- A. Yellow and green luminescent elements (1.2 billion)
- B. Field effect type elements for microwaves (300,000)
- C. Elements for laser (300,000)
- D. Wafers for the elements mentioned in the three preceding items (30,000)

II. Kinds and quantities of facilities needed to be newly installed (hereafter this will be referred to as "Kinds, etc. of facilities")

- A. Facilities for the manufacturing and assembly of components (900 units)
    1. Epitaxial growth facility

2. Photoresist facility
3. Diffusion facility
4. Vacuum deposit facility
5. Insulating membranes forming facility
6. Seal-in facility
7. Assembling facilities
8. Other facilities required for manufacturing and assembling components

B. Testing and inspecting facilities

1. Testing and inspecting facilities
2. Air-purifying facility
3. Pure water producing facility
4. Dust-proof device
5. Pollution-preventive facility

III. Items concerning the fund required for the increase of production (hereafter to be referred to as "Fund") (10 billion yen)

A. Establishment of large cross section, high grade crystal growing technology, multilayer, epitaxial growing technology, impurities-diffusing technology, etching technology, wiring technology and other manufacturing technologies

B. Acceleration of the development of the crystal growth facility, multilayer epitaxial growth facility, and testing and inspection facilities

C. Investigations on the trends of overseas technologies

D. Cooperation with the related industries in joint efforts so that effective developments can be made in the new applied fieldsz

(6) Semiconductor IC (limited to MOS Type IC with 100,000 or More Elements and Bipolar IC with 5,000 or More Elements

I. Production proposed for 1984
   A. MOS IC (4 million)
   B. Bipolar type IC (3 million)

II. Kinds of facilities
   A. Facilities for manufacturing and assembling components (80 units)
      1. Pattern-designing facility
      2. Mask forming facility
      3. Membrance growth facility
      4. Photoresist facility
      5. Diffusing facility
      6. Vacuum depositing facility
      7. Assembling facility
      8. Facilities for manufacturing packaging materials and components
      9. Other facilities needed for manufacturing and assembling components
   B. Testing and inspecting facilities (130 units)
      1. Testing and inspecting facilities
      2. Environment testing facility
      3. Other facilities needed for testing and inspection
   C. Other facilities
      1. Air-purifying room
      2. Air-purifying facility
      3. Pure water producing facility
      4. Dust-proofing device
      5. Pollution preventive facility

III. Fund (25 million yen)
   A. 25 million yen

IV. Others

A. Establishment of technology for high precision, high density pattern designing, technology for controlling the depth of diffusion, technology concerning the decrease of the threshold voltage and other technologies related to the large scale integration.

B. Acceleration in the automation of product designing; automatic controlling of the steps of chemicals deposition, diffusion, and epitaxial growth; and continious processing.

C. Acceleration of the development of high density pattern manufacturing device, high-precision mask manufacturing device, high speed assembling facility, high speed testing facilities, and others.

D. Investigations of the trends of the overseas technologies.

(7) Liquid Crystal Display Cell (Limited to Dot Matrix Type)

I. Production proposed for 1984: 2 million

II. Kinds, etc. of facilities

A. Facilities for manufacturing and assembling components

1. Substrate (glass) manufacturing facility
2. Electrode pattern forming facility
3. Interfacial membrane and orientation control treatment facility
4. Assembly and seal-on facility
5. Liquid crystal treatment-sealing facility
6. Polarizing plate bonding facility
7. Other facilities for manufacturing and assembling components

B. Testing and inspecting facilities (50 units)

1. Testing and inspecting facilities
2. Environment testing facilities
3. Other facilities for testing and inspecting

C. Other facilities (30 units)

1. Air-purifying room
2. Air-purifying facility
3. Pure water producing facility
4. Dust-proofing facility
5. Pollution-preventive facility

III. Fund

A. 2 billion yen

IV. Others

A. Establishment of high-precision micro-pattern forming technology, technologies for arraying, coupling, connecting and other manufacturing technologies.

B. Increasing efforts for improving reliability

C. Increasing efforts for grasping the technological trends overseas and the trend in demands.

(8) Materials For Electronic Apparatus

I. Chemical Compound Semiconductor Materials (limited to those whose main components are gallium and phosphorus)

II. Proposed production for 1984: 2,000 kg

III. Kinds, etc. of Facilities

3. Electronic Apparatus -- Apparatus for Rationalization

(6) ICs

I. Performance

A. Semiconductor ICs

1. MOS type and logic circuits; defect rate must be below 50 fits and those which can be used at temperatures from 40 degrees beow zero to 90 degrees above
2. MOS type ICs and memory circuits--defect rate below 30 fits -- temperatures -40 degrees to +90 degrees

3. Bipolar type and digital type ICs--defect rate below 10 fits and temperatures -40 degrees to +100

4. Bipolar type and linears (limited to industrial apparatus case) (used in temperatures -40 degrees to +90; defect rate below 20 fits)

B. Hybrid ICs ("Thick Film")

1. Those with defect rate below 80 fits from -50 degrees to +120 degrees. ("Thin Film")

II. Target for Production/Reduction Rate Will be as Follows in Relation to Production Cost in 1977

A. Semiconductor ICs

1. MOS and logic circuits (cost reduction of more than 40%)

2. MOS type memories (cost reduction of more than 50%)

3. Digital and bipolar (cost reduction of more than 45%)

4. Bipolar and linear (industrial apparatus 45%)

5. Bipolar and linear (other than industrial 40%)

II. Kinds of Equipment

A. Semiconductor ICs

1. Parts production and assembly (8300)

a. Pattern design (   )

b. Mask production (   )

III. Funds

A. Semiconductor ICs

1. 250 billion yen

B. Hybrid ICs

1. 30 billion yen

III. Other

A. Standardization should be promoted

B. Efforts should be made to establish guarantee system

C. To promote development and commercialization design technology and implement

D. Try to establish technology concerning control technology of diffusion depth and control

E. Attempt development and diffusion of automation control and continuous processing for production

F. Try to develop pattern design equipment, mask device

G. Try to grasp overseas technology trends

H. Attempt to needs in each demand field through establishment of cooperative regime with users.

POINTS OF POLICY EMPHASIS FOR FY 1982

MACHINE INFORMATION INDUSTRY BUREAU'S
POINTS OF EMPHASIS IN POLICY IMPLEMENTATION FOR FY 1982

--Budget, Fiscal Investment, and Taxation--

February 1982

Ministry of International Trade and Industry

Bureau of Machine Information Industry

[Full Translation of the Text, pp. 1-5]

Fostering of Technologically Most Advanced Industries

I. Promotion of Electronic Computer Industry

A. Speeding up the Development of Basic Technology for Next Generation Electronic Computers

In order to respond to the diversifying and heightening needs of the people in the midst of ever increasing constraints of resources and energy, it is necessary to speed up "information revolution" centering around electronic computer. The electronic computer industry is important not only as the bearer of information revolution but also as the strategic industry holding a key to the heightening of our country's industrial structure in the future.

For this reason, the Ministry of International Trade and Industry has administered a variety of policies aimed at the independence and stabilization of our country's computer industry. As a result of this, and owing to the corresponding efforts of the domestic producers, our country's computer industry is about to stand on its own feet.

However, due to the disclosure of a large-sized new machine (3081), which commands far superior cost performance over the traditional ones, by IBM which occupies about 60% of share in the world's computer market, the computer passed into a new generation (the 4th generation). As for this 4th generation computer, adoption of epochal new technology to its hard and soft ware, great enhancement of its cost performance, emergency of new functions, and a leaping expansion of its utility are expected. Thus, the urgency of developing next generation computer system in our country became even more heightened.

The one which will become the technological core in the soft ware aspect of next generation computer is the ultra-LSI which is a highly densified and high-speed-converted LSI. Because there was a need for developing this prior to the development of soft ware technology we obtained a subsidy for it and have successfully developed it under a four-year plan, which was completed in 1979 as originally scheduled.

However, next generation computer system demands extremely revolutionary new functions, which have not been existent thus far, not only in its hard ware but also in its soft ware and surrounding terminal equipment. In the soft ware technology our country lagged behind other countries in the past, and it is imperative to pursue advanced technological development in control program such as network technology, data base machine technology, and (baachal?) machine technology and in highly advanced language processing technology capable of processing information in Japanese. Also, in the field of surrounding terminal equipment technology, there is a strong desire to develop machine technology capable of processing information in Japanese, which is naturally easier for the Japanese to handle than the traditional one using English. Accordingly, there is a need to promote advanced technology for the Japanese language input-output equipment and the ultra-large-capacity outside memory equipment.

For the purpose, under a five-year plan covering from 1979 to 1983 with a total R&D capital of 47 billion yen, the development of the basic soft ware technology (operating system: OS), which is the core of the soft ware technology, and the new surrounding terminal equipment technology where technological revolution is salient is being promoted under the industry's uniform research association system (the Electronic Computer Basic Technology Research Association). A 50% subsidy was given for such development in the past. However, for 1982, a 45% subsidy has been decided as an exceptional measure reflecting the financial rehabilitation which is now under way. In 1982, which is the fourth year of the plan, a part of the work originally scheduled for 1983 will be implemented ahead of the schedule, thereby accelerating the development.

General Account:

Subsidy for the promotion of next-generation electronic computer basic technology development........	5,616,000,000 yen (6,200,000,000 yen)
Of the above, the subsidy for the promotion of basic software technology development............	4,986,000,000 yen (5,150,000,000 yen)
------------, the subsidy for the promotion of new surrounding terminal equipment technology development........................	630,000,000 yen (1,050,000,000 yen).

B. Electronic Computer Basic Technology Development (The Fifth Generation Computer Research and Development)

In regard to the Neuman-model computer which has been used thus far, a variety of problems, theoretical as well as structural, have been raised. It is likely, therefore, that a new computer which is based on a revolutionary theory and technology, namely the fifth generation computer, is to emerge in the beginning of the 1990's.

For this reason, with the goal of realizing a computer system desirable for the 1990's in the next ten years or so, it is decided that, between 1982 and 1984, the basic technological development of fifth generation computer, including an experimental production of the functionally separate-mechanism module based on the new theory of data-flow-type architecture and a trial production of the basic soft ware for experimental-system use, will be carried out under the form of entrustment.

General Account:

Entrustment expenditure for electronic computer basic technology development................	423,000,000 yen
(The Fifth Generation Computer Research and Development)	(12,041,000 yen)

C. Strengthening of Sales Structure

With the disclosure of a new model computer by IBM, the computer passed into a new generation (the fourth generation). Because the price of hard ware in the case of the fourth generation computer is expected to go down drastically, it is inevitable to have sales competition which is harsher than before. Moreover, because it was decided to implement two years' portion of the gradual tariff reduction agreed on at the Tokyo Round, which included tariff on computers, a harsher market situation for the fragile domestic producers can be expected.

Under this circumstance, in order to secure a long-range developmental base for the computer industry of our country, it is decided to continue the Development Bank loan with the most favored customer interest rate for the JECC which is a joint rental company. In addition, for the purpose of improving industrial structure, the Development Bank loan will be continued for computer producers.

Fiscal Investment:

Domestic Electronic Computer Promotion (JECC)

Development Bank, from the 51.5 billion yen set aside for the category of electronic computer promotion

(from the 46 billion yen, the same)

Electronic Computer Structural Improvement

Development Bank, from the 51.5 billion yen set aside for the category of electronic computer promotion

(from the 46 billion yen, the same).

D. Promoting the Dissemination of High-Efficiency Electronic Information Remote Processing Equipment

In order to promote the dissemination of high-efficiency electronic information remote processing equipment, the first-year special depreciation rate of 13/100 currently in effect is changed to 10/100 for the installers of the equipment. Also, its applicable period is extended when there are needs for adjustment as a result of converting the systems currently in operation into a larger size.

Taxation:

From the Special Depreciation Measure Concerning Principal Compound Machine Equipment,

Two-year extension of applicable period for the high-efficiency information remote processing equipment.

[Full Translation of the Text, pp. 8-13]

II. Promotion of Information Processing Industry

In regard to the information processing industry (software industry, information processing services industry, and data base services industry), a variety of systematic and institutionalized policies have been implemented to strengthen technological development and operational bases.

From now on, along with the promotion of fundamental liberalization of the communication circuit utilization which has been impeding the development of information processing industry and our country's information revolution, a variety of promotional policies are to be expanded as shown below.

A. Strengthening the operation of the Information Processing Promotion Work Association

Amidst the call for moving into a knowledge-intensive industrial structure, the speeding up of information revolution is more desirable than ever before. The promotion of the information processing industry which is the bearer of such information revolution thus remains an important policy task, especially in view of the situation that a technological gap between Japan and the United States has not disappeared.

For this reason, with the purpose of speeding up our country's information revolution and fostering the information processing industry, the operational activities of the Information Processing Promotion Work Association which was established in 1970 are to be further strengthened and expanded as shown below.

General Account:

Subsidy for the operational expenses of the Information Processing Promotion Work Association (includes the entrustment development expenses for specially designated programs, the special entrustment expenses for software maintenance technology development, and the technological development promotion expenses for advanced information

processing).........................2,620,453,000 yen
(2,658,000,000 yen)

(Scale of Operation: 3,455,838,000 yen)
(3,373,385,000 yen)

1. Expansion of Specific Program Development

In order to heighten computer utilization and to promote the circulation of programs, the Information Processing Promotion Work Association has been developing, under the form of entrustment, those advanced but widely used programs which are difficult for companies to develop for their own. The Association has also been promoting the dissemination of the programs thus developed. These promotions and developments are to be continued in 1982.

General Account:

From the Operational Expenses of
the Information Processing Promotion
Work Association,

Program Development Purchase
Expenses........................1,350,838,000 yen
(1,350,838,000 yen)

2. Promotion of Software Maintenance Technology Development Plan

The software requires maintenance operation because of the change in the operating system's processing environment and of the necessary adjustments for users' needs. The maintenance cost occupies 70% of the software cost, and the maintenance operation is done manually, thereby lowering productivity and reliability. These factors are contributing to the rise of software cost.

In order to overcome this condition, a comprehensive system to rationalize and automate the maintenance operation and to enhance productivity and reliability is to be developed during the period of five years beginning in 1981 (Total amount, about 5 billion yen). Following the basic plan established in 1981, a full scale implementation of the technology development will be carried out in 1982.

General Account:

From the Operational Expenses of
the Information Processing Promotion
Work Association,

Special Entrustment Expenses for Software Maintenance Technology Development	840,000,000 yen (140,000,000 yen)

3. Promoting the Development of Advanced Information Processing Technology

With the progress of information processing, the development of an advanced information processing technology combining the software technology and other technology became essential for the progress of our country's information revolution. However, situation is such that the existing developers are unable to perform the development, thereby necessitating the government's support for such technological development.

To accomplish the development of such structurally compound advanced information processing technology, a concentration of a variety of skills and resources is imperative. For this reason, a technology center was established in 1981 in the Information Processing Promotion Work Association, to which the best technicians from the information processing industry, computer makers, computer users, and universities were recruited to engage in research and development. This program will be further expanded in 1982.

General Account:

From the Operational Expenses of
the Information Processing Promotion
Work Association,

Promotion Expenses for Advanced Information Processing Technology Development	708,936,000 yen (395,434,000 yen)

B. Strengthening the Information Processing Industry's Business Operation Bases

The information processing industry has a strategic importance in the improvement of national living standard and in the knowledge-intensification of industrial structure. The existing conditions, however, show low technological power and productivity. Also in terms of the scale of business operation, there are many weaknesses compared to the advanced countries of Europe and America, thereby necessitating a strong promotional policy.

Especially from the viewpoint of the procurement of industrial capital, a satisfactory supply of capital from private financial organizations cannot be expected due to the lack of collateral or the shallowness of company's history.

For this reason, loan guarantee by the Information Processing Promotion Work Association and procurement of loan from 3 long-term trust banks on the basis of the Capital Operation Department's debts underwriting have been administered since 1970. These measures have proved to be an important factor in the promotion of our country's information processing industry.

In view of the effectiveness of these measures, they are to be implemented also in 1982......[14 lines omitted hereafter, translator]

General Account:

Promotion of the Information Processing
Industry's Security Measure..............4,387,000 yen
(2,438,000 yen)

Fiscal Investment:

Financial Measure for the Promotion
of Information Processing...............5 billion yen
(Monetary Debts Underwriting (5 billion yen)

Promotion of the Systemization of
Information Processing System

Development Bank, from the 51.5 billion yen set aside
for the category of electronic
computer promotion

(from the 46 billion yen, the same)

Intensification of Information Processing

Development Bank, from the 51.5 billion yen set aside for the category of electronic computer promotion

(from the 46 billion yen, the same)

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JIPDEC REPORT

NO.27

Japan Information Processing Developmen Center (JIPDEC) was established in 1967 wit the support of the Government and relate industrial circles. JIPDEC is a non-profit or ganisation aimed at the promotion, research and development of information processing and information processing industries in Japan.

JIPDEC REPORT is to be published thre times a year with a view to introduce the statu of information processing in Japan to foreig countries.

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INFORMATION PROCESSING POLICIES FOR FISCAL 1976 (I)

The Ministry of International Trade and Industry

Utilization of computers in Japan has continued to expand at a rapid rate. Whereas the number of computers in actual use as of the end of September, 1970, was 7,910, and they were valued at 748,800 million yen, exactly five years later 32,450 computers were in use and were valued at a total of 2,080,900 million yen. Thus, in only five years, there has been an increase of 2.8 times in the value of computers in use and an increase of 4.1 times in the number of computers, for average annual growth rates of 23% and 33% respectively. According to the program for achieving more advanced use of computers by the government announced in March, 1976, by the end of fiscal 1980 there are expected to be 36,400 computers in use and these computers are expected to be worth 3,500,000 million yen. Thus, average annual growth rates of more than 20% for value and more than 30% for number of computers are expected for the next few years.

While rapid growth may consequently be expected of the hardware industry, and the information processing industry, the following characteristics may be cited for these industries. Both are excellent examples of low-resource-consuming industry, and of non-polluting industry as well. Moreover, because of their position of leadership in technological fields, they impart strong repercussion effects to other industries. In view of these characteristics, these must be considered key industries within the over-all structure of Japanese industry.

I. THE PROCESS OF LIBERALIZATION

Keeping the implications of the foregoing in mind, liberalization of imports of computer industry, and of foreign investment in the industry, have been greatly retarded, in order that the domestic industry could secure a self-sustaining position, but because of pressure from abroad as well as other reasons, gradual progress was made in effecting liberalization, leading up to liberalization of imports of computers, in December, 1975, and liberalization of capital investment in the software industry, in April, 1976. These moves have brought the Japanese information industry into direct confrontation with foreign competition.

II. MEASURES TO BE TAKEN IN FISCAL 1976

In order to assist Japanese organization and private corporations prepare for liberalization, and also in view of the importance to Japan of the computer industry, during fiscal 1976, in addition to implementation of policies which had been adopted in the past, several new policies have been adopted. All of these policies comprise four groups, namely, (1) policies for promotion of the hardware industry, (2) policies for promotion of the information processing industry, (3) the development of social systems, and (4) the improvement of the infrastructure for greater utilization of information in all areas of activity. Of these, the main contents of (1), (2) and (3) are described below.

1. Policies for promotion of the hardware industry

(1) Subsidies for promotion of the development of new computer models

(Unit: million yen)

Fiscal 1976 budget	Last year's budget	Change (Δ=decrease)
10,825	12,475	Δ1,650

IBM's most prominent computers at present are those in the 370 Series, which utilize LSIs and which are far superior in cost-performance to the previous 370 Series models in which ICs were used. It is an urgent matter that Japan's domestic industry develop new models which can successfully compete with these, and for that purpose the MITI has facili-

THE PROCESS OF LIBERALIZATION

July 1971	Fourth capital liberalization round adopted Measures adopted for liberalizing capital investment and imports of computers and related equipment. Capital Liberalized to 50% as of August, 1974, on an automatic basis Imports Liberalization of peripherals (excluding memory units and terminals) in the near future, implemented from February 1972
February 1972	Implementation of liberalization of imports of most peripherals
April 1972	In keeping with reduction of customs tariffs, the rates for main frames was reduced from 15% to 13.5% and that for peripherals was reduced from 25% to 22.5%
[illegible] 1972	Measures adopted for liberalization of importation of technology Hardware From June 1, 1974 Software From July 1, 1974
August 1972	Decision reached to adopt a flexible stance regarding liberalization of imports, on an acquisition basis, until foreign-made computers acquire a share of 50%
April 1973	Decision made to liberalize capital investment. Hardware industry 100% liberalization as of December 1, 1975 IC industry 100% liberalization as of December 1, 1974 Information processing industry 50% liberalization as of December 1, 1974 100% liberalization as of April 1, 1976 Imports liberalized for ICs with less than 200 elements
June 1973	Decision reached to liberalize imports of computers (main frames, parts, memory units and terminals) and ICs (of 200 or more elements) Computers Implementation "during 1975" scheduled for December 24, 1975 ICs Implementation "during 1974" scheduled for December 25, 1944

tated the formation of three groups of domestic computer makers and made available to those groups subsidies amounting to up to 50% of development costs.

(2) Subsidies for promotion of the development of peripherals and other devices

(Unit: million yen)

Fiscal 1976 budget	Last year's budget	Change (△ = decrease)
600	900	△300

MITI provides subsidies for up to 50% of development costs incurred by domestic computer and computer equipment makers for the development of peripherals and terminals (plotters, character display units, serial printers, OCR devices, intelligent terminals, key-to-mag-tape devices, etc.)

(3) Subsidies for development of super-LSIs for the next generation of computers

At present, IBM is developing what has been provisionally termed the Future System of computers

(Unit: million yen)

Fiscal 1976 budget	Last year's budget	Change (△ decrease)
3,500	0	3,500

which are intended to be better than the IBM 370 Series in cost-performance and accompanying software and terminals will correspondingly be furnished with innovative technology. It is expected that the new generation of FS computers will be announced in the near future. Development of computers which can compete with this new generation has been an urgent issue.

Of central importance to the new generation is the super-LSI, which has high density and high speed than conventional LSIs. Accordingly, subsidies have been made available for promotion of the development of Super-LSIs for use in computers; these subsidies amount to up to 50% of development costs incurred in a combined development effort by Japan's computer manufacturers.

(4) Japan Development Bank loans for JECC

(Unit: million yen)

Fiscal 1976 budget	Last year's budget	Change (△ decrease)
47,000	46,000 (of which subsidies 13,000)	1,000

Most acquisitions of computers in Japan are through a rental system which eliminates the need for the computer user to make a high initial investment and has the additional merit of providing a hedge against obsolescing of hardware. This method places a great burden on the computer manufacturer, however, and in order to lighten this burden, and promote the development of indigenous Japanese computer manufacturers, since 1961 Japan Development Bank loans to the Japan Electric Computer Co. (JECC) to guarantee rental charges. Such investment by the JDB will be continued in fiscal 1976 in view of the expected impact of competition with IBM and other foreign manufacturer subsequent to complete liberalization.

(5) Japan Development Bank loans for structural improvement

For such purposes as improvement of the international competitiveness of the Japanese computer industry, progress has been made in structural improvement of the industry through such steps as business tie-ups among the six Japanese computer manufacturer, and to further promote structural improvement of the industry, JDB loans will be available for equipment investment.

(6) Japan Development Bank loans based on the Law on Extraordinary Measures for the Promotion of Specific Electronic and Machinery Industries

(Unit: million yen)

Fiscal 1976 budget	Last year's budget	Change (△ decrease)
8,500	8,500	0

On the basis of the Law on Extraordinary Measures for the Promotion of Specific Electronic and Machinery Industries, JDB loans are available to hardware makers for investment in rationalization of production, commercialization of new technology, and similar purposes.

(7) Reserve fund against losses when buying back computers

When a computer user terminates a rental contract with JECC, the manufacturer of the computer used must buy it back from JECC. At such a time, a loss of 20% of the sales price may be applied to a repurchase reserve by the computer manufacturer.

(8) Special depreciation arrangements for computers

To facilitate the acquisition of computers from the viewpoint of the contribution thereby made to the improvement of information processing and to the use of information, as well as for the purpose of assuring a stable market for computer makers, accelerated depreciation is permitted for purchasers of computers, whereby one-fifth of the value may be depreciated in the first year.

2. Improvement of assistance provided to the Information-technology Promotion Agency etc.

(1) Subsidizing of the operating costs of the Association (With the exception of development of software production technology)

(Unit: million yen)

Fiscal 1976 budget	Last year's budget	Change (△=decrease)
1,233	1,322	△89

The Information-technology Promotion Agency (IPA), established in October 1970, has the objective, true to its name, of promoting information processing through the development of software and facilitation of its diffusion, as well as activities on behalf of the development of the information processing service industry. The MITI has assisted such activities as the IPA's commissioning to software companies the development of advanced general-purpose programs, and by subsidizing purchase and rental costs.

(2) Software Production Technology Development Program

(Unit: million yen)

Fiscal 1976 budget	Last year's budget	Change (△=decrease)
500	0	500

As a measure in preparation for the liberalization of the information processing industry, on the basis of the results obtained from the software module subsidy activities implemented from fiscal 1973 through fiscal 1975 (3,000 million yen in three years), in order to develop the basic technology needed for automation of production of new software, a special subsidy has been provided to the IPA.

(3) Establishment of a loan system for promotion of information processing

Credits are extended by the Long-Term credit Bank of Japan and two other banks, using funds from the Trust Fund Bureau of the Ministry of Finance, for the following:

(a) Acquisition of computers by information processing service bureaus and others; program development; education of information processing personnel, and improvement of other business activities, and

(b) Education of information processing personnel in private enterprises in general, and development of programs in such enterprises.

(4) Japan Development Bank loans for software development

For the promotion of software development, loans are to be provided by the JDP to hardware makers and information processing companies, for software development, the education of information processing personnel, acquisition of computers to be used for training, the purchase of land and buildings; education and training facilities, as well as appurtenant facilities.

(5) Program bonding reserve fund

By means of seeking to facilitate the sound development of the software industry through stabilization of the management of software companies, the making of deposits to form a reserve fund, to prepare for maintenance expanses which are incurred after a program has been acquired, has been approved.

3. Development of social systems

(1) Development of "medical information processing system"

(Unit: million yen)

Fiscal 1976 budget	Last year's budget	Change (△=decrease)
461	313	148

Demand for improvement of health and medical care services has not been matched by expansion and improvement of supply functions, to the extent that the disparity has become a social problem of national dimensions.

In order to contribute to rectification of this situation, by means of the utilization of information technology and development of a medical information processing system in which latest advances of medical electronics are utilized, it is intended to improve the productivity of health and medical services and reduce regional disparities.

As specific measures to be taken toward realization of this objective, efforts have been made to develop a comprehensive health and medical information system wherein special information processing units for installation in hospitals, as well as a special language, are developed. In continuation of basic surveys and research undertaken in fiscal 1973, basic system design work undertaken in fiscal 1974, and detailed design work undertaken in fiscal 1975, experimental models of the equipment are to be built during fiscal 1976, and used in trial applications.

(2) Development of a "living visual information system for daily living"

(Unit: million yen)

Fiscal 1976 budget	Last year's budget	Change (△=decrease)
863	884	△ 21

With CATV, video packages and other recent advances in technology applications as the basis, efforts are to be continued on the development of twoway living visual information system, such as computer-aided instruction, facsimile transmission, TV shopping and the like.

Because of the all-encompassing nature of the relationship of these systems to daily life, an entire town has been selected for experimentation and efforts at gaining an understanding in concrete, quantitative terms of the needs of users, by trial operational use of the system and equipment, so that the system and its equipment may be further developed.

Thus far, work has comprised basic design (fiscal 1972), detailed design (fiscal 1973), development of experimental models of equipment (fiscal 1974 and 1975), and in fiscal 1976 work will be concentrated on the construction of subsystems.

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Information Processing Policies for 1978 (I)

TEN BILLION YEN FOR VLSI DEVELOPMENT

– MITI Policies Related to Data Processing –

Policies of the Ministry of International Trade and Industry (MITI) for fiscal (FY) 1978 concerning data processing and industries related to data processing are as shown in the following table. The main point is the assistance for development of VLSI, a project which is in its third year. According to the "Law for Extraordinary Measures for Specific Machinery and Information Industries" which replaced the "Law for Extraordinary Measures for Specific Electronic and Machinery Industries" which became ineffective in March, 1978, inclusion of the software industry among those to be promoted and subsequent enforcement based on the concept of "unification of machinery and information" are of interest.

MITI Policies to the Information Industry Related

(Unit: million yen)

Classification	Policies	FY 1976	FY 1977	FY 1978
Hardware promotion	Financial assistance for development and promotion of LSI for next generation of computers	3,500	8,640	10,052
	Japan Development Bank financing for JECC	47,000	(Note 1)	(Note 2)
	Japan Development Bank financing for structural improvement among computer manufacturers	(Note 3)	(Note 1)	(Note 2)
	Financial assistance to promote the use of computers by chambers of commerce, etc.	600	88	104
	Reserve fund system for losses from returned computers	–	–	–
	Japan Development Bank financing for promotion of information systematization	(Note 3)	(Note 3)	(Note 2)
	Data processing promotion taxation	–	–	–

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(Unit: million yen)

Classification	Policies	FY 1976	FY 1977	FY 1978
Hardware promotion	Loan system to promote computer security (Small Business Finance Corporation)	0	0	2,500
Software promotion	Special commissions for software production technology development	500	850	1,112
	Financial assistance for operation of Information-Technology Promotion Agency (except for commissioning for software production technology development)	1,233	1,198	1,167
	Data processing promotion financing measures	13,000	11,000	8,000
	Japan Development Bank financing for software development	(Note 3)	(Note 1)	(Note 2)
	Program guarantee reserve fund system	–	–	–
	Tax deduction system for data processing technology training and research expenses	–	–	–
Promotion of system and technical development	Development of pattern data processing systems (large-scale projects)	3,390	2,916	2,514
	Health care network system development costs	(461)*4	(440)*4	192
	Visual Information processing system development costs	553	439	39
	Development and survey costs for an energy saving urban equipment system	108	42	33
Basic expansion of data processing	Survey and research fees for establishing system auditor system	0	6	5
	Safety measures for software, etc.	1	1	1
	Compilation of directories of data processing services, etc.	1	1	1
	Certification examination for information processing engineers	47	52	57
	Holding information familiarization Week	1	1	1
	Survey of the status of data processing	16	17	16
	Investigations for Information network formation	2	2	2
	Computer shipment and trade-in surveys	5	5	5
	General survey of problems of data processing engineers	0	0	2

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(Unit: million yen)

Classification	Policies	FY 1976	FY 1977	FY 1978
Basic expansion of data processing	Systematization surveys, industry by industry	2	2	2
	Standard model system design research to promote information use	0	0	5
Promotion of governmental data processing	Promotion of data processing in MITI	2,885	3,290	3,956
	Research and development of joint computer utilization techniques for government ministries and agencies	65	65	63

Notes 1: Total 52 billion yen
2: Total 56 billion yen
3: In other JDB Categories
4: Up to FY 1977, shown as development costs for medical care information system

1. Outline of FY 1978 Policies

The ministry has conducted various measures for promoting information industry largely on the basis of reports from the Information Industry Subcommittee of the Industrial Structure Council and Information Processing Promotion Council. These reports emphasize the expansion of policies related to technical developments regarding both hardware and software; financial and taxation measures to strengthen the administrative for marketing, distribution and promotion; development and spread of social systems which improve the people's welfare and create new fields of industry; the training of data processing specialists; and education and other measures to provide a foundation for greater use of information in society.

These various promotion policies can be classified into the following categories: (1) Promotion of the computer industry and technical developments, (2) Promotion of the data processing industry and raising the level of data processing, (3) promotion of more efficient use of information and development of social systems, (4) measures to protect users, (5) establishment of a foundation for greater information use, (6) promotion of information utilization by small businesses; and (7) promotion of governmental data processing. The following sections outline FY 1978 policies based this classification.

1. Promotion of the Computer Industry and Technical Developments

(1) Financial assistance for development of LSI for the next generation of computers

This involves financial assistance for the so-called VLSI development project. Details of this project are described in the next section.

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(2) JDB financing for promotion of the computer industry

To assure the independence of the Japanese computer industry so that it can cope with the major American Manufacturers such as IBM the following three types of financing are to be provided by the Japan Development Bank (JDB). These will contribute to strengthening the managerial systems by improving marketing capability; will promote constitutional improvement, and will promote the development of software.

1) JDB financing to guarantee the rental capital of JECC

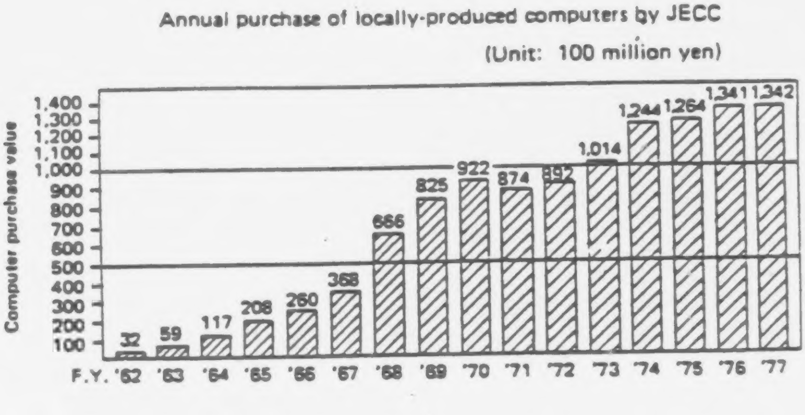
Computer marketing is mainly based on rentals. For the user, rental makes it possible to spread expenditures over time and to trade up when the computer presently used becomes out-dated or more computing power is needed. However, for the manufacturer, rental means that income is delayed long beyond the time that production and sales expenses have arisen, and the burden of marketing expenses is great. Therefore, in 1961, the Japan Electronic Computer Co., Ltd. (JECC) was formed by the joint investment of domestic computer manufacturers under the direction of MITI and since that time, JECC has been working as a domestic rental company. The mechanism involves JDB financing of JECC at a preferential interest rate.

The capital invested in JECC includes public capital from JDB; capital from financial institutions, insurance companies and foreign banks (in Japan); and its own capital obtained from increases in stockholders' equity and rental income.

JECC's stockholders now include the following seven companies; Fujitsu Ltd., Hitachi Ltd., Nippon Electric Co., Ltd., Tokyo Shibaura Electric Co., Ltd., NEC-Toshiba Information System, Mitsubishi Electric Corp. and Oki Electric Industry Co., Ltd. These companies are increasing their own rentals (rental by manufacturers) in accordance with increases in the strength of each company, and the dependence of Hitachi on JECC is especially low. However, the purchase of locally produced computers by JECC is increasing every year and the company is still

Annual purchase of locally-produced computers by JECC

(Unit: 100 million yen)



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the largest computer rental company in Japan.

2) JDB financing for structural improvement of the computer manufacturing industry

The six Japanese manufacturers have been seeking more effective arrangements in regard to computer-related activities. Establishment of cooperative ties has been financially supported by JDB since FY 1972 and this financing is being continued in FY 1978.

This system has played a definite role in narrowing the capital gap between foreign manufacturers such as IBM and domestic computer manufacturers. The Japanese manufacturers rapidly put this system into effect when they became involved in the production and marketing of new series of computers. Moreover, this system is highly significant because its guarantee of funds serves to encourage equipment investment.

3) JDB financing for software development

It is expected that the share of software costs among total data processing costs will gradually increase in the future and the promotion of advanced, high quality software development is thus of major importance. Therefore, this financing is provided for the computer manufacturers and software companies, to provide funds for the computers, buildings, land and other facilities required for software development and the training of data processing personnel. This system of financing has been in effect since FY 1970.

The development of software by such financing includes the development of programs intended to contribute to the improvement of the level of computer utilization on the basis of Article 3 of the "Law Concerning Information – Technology Promotion Agency".

(3) Reserve fund system for computer repurchase losses

Japanese computer manufacturers conduct much of their rental business through JECC but when the user returns a rented computer, the manufacturer must repurchase it from JECC at the residual value at the time of return. However, this residual value includes profits and indirect expenses not included in the assets and there is a big difference between the residual price of the used computer and the actual value. Therefore, the manufacturer suffers a trade-in loss.

To prepare for such losses, a reserve fund has been accumulated by setting aside fixed percentages of income (set at 10% at the beginning in 1968, and raised to 15% in 1970 and 20% in 1972). In FY 1978, the rate is to be revised on the basis of past results to improve the balance sheets of the companies.

(4) Fixed asset tax relief and special depreciation systems for computers

These are aids to computer users rather than for computer manufacturers.

In contrast to being able to handle the complete amount of rental fees as expenses each month, only the depreciation can be treated as an accounting expense when a computer system is purchased and a huge outlay is necessary at the time of

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purchase. This tax relief and special depreciation system, which was established in FY 1970, is intended to lighten the burden. Currently, a special accelerated depreciation of one-fifth is permitted in the first year the computer is purchased. The fixed asset taxes at the local level are also reduced to correspond to the special depreciation system at the national tax level. In FY 1978, special depreciation system will be established whereby one-sixth of the purchase price will be excluded from the taxable value for three years after the purchase of computer system.

(5) Development of a pattern information processing system

Following the development of the super high performance computers from FY 1966 through 1970, research and development concerning pattern information processing system was started in FY 1971 as a large-scale industrial technology research and development project (known as a "large scale projects system") for a new generation of computers which can handle direct input, recognition, processing and output of various patterns such as characters, pictures, objects and voice sounds. This development will also be continued in FY 1978.

2. Promotion of the Data Processing Industry and Raising the Level of Data Processing

(1) Software production technology development plans

The subject plan was established to eliminate the software gap between Japan and the United States. At present, the Information-Technology Promotion Agency (IPA) is commissioning development work for automation of programming systems. The work, which is being performed by software companies, involves the editing and assembling of program modules, which will greatly improve program productivity and increase reliability. The development plan was started from FY 1976 as the result of software module subsidies from FY 1973—1975 (3 billion yen for 3 years).

(2) Subsidies for operating expenses of IPA

Subsidies are given toward the operating expenses of the Information-Technology Promotion Agency (IPA) which was founded in 1970, to carry out work related to the promotion of the development and supply of software, and the growth and development of information processing service companies. Subsidies are given to IPA on the basis of the above-mentioned software production technology development plan. The organization of IPA operations is as shown in the following figure.

(3) Financial measures for promotion of data processing

These measures involve financing by three long-term credit banks while waiting for acceptance of bank debentures by the Trust Fund Bureau of the Ministry of Finance. They act in unison to provide credit guarantees to IPA. These ware extraordinary measures originally limited to FY 1976 but were felt valuable enough

COMPUTER WHITE PAPER

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JAPAN INFORMATION PROCESSING DEVELOPMENT CENTER
(Japan Computer Usage Development Institute)

Part III: Computer Policy and Information Industry Policy

Measures for the Promotion of Hardware

Until 1970, government promotion of the electronics industry and machinery industry was carried out under separate laws, the Law Concerning Temporary Measures for Promotion of the Electronics Industry and the Law Concerning Temporary Measures for the Promotion of the Machinery Industry. In 1971, however, these two laws were consolidated under a single law, the Law Concerning Temporary Measures for the Promotion of Specified Electronics Industries and Specified Machinery Industries (Law No. 17 of 1971). The Law specifies two types of computers requiring promotion which it designates as A-type machines (those which require research and development regarding production technology) and C-type machines (those which require rationalization of their production systems). In line with the provisions of the Law, the Government announced its Improvement Plan relative to computers in November of 1971 and has been conducting its promotional activities on the basis of the Plan since that time. The Plan was partially revised and expanded in 1975.

Measures carried forward during 1974 relative to hardware promotion included the following:

1. Financial Assistance for the Promotion of the Development of New Computer Types

Aid was given to the three reorganized domestic computer manufacturing groups

Table 10

(In ¥ million)

1973	1974	1975
14,410	15,250	12,475

Table 11

Recipients of Assistance for Promotion of Computer Research (1975)

Recipient	Field of Research
Ultra High Performance Computer Development Group Members Fujitsu Fujitsu Research Institute Hitachi Hitachi Koki Nippon Peripherals Co., Ltd	Experiment and Research on Ultra High Performance Electronic Computer System
New Generation Computer Series Development Group Members NEC NEC Kyushu NEC Toyama Toshiba Japan Business Automation Japan Data Machine	Research and Development of New Generation Electronic Computer Family Series
Ultra High Performance Electronic Computer Research Association Members Mitsubishi Electric Mitsubishi Research Laboratory Oki Electric	Developing Prototype Ultra High Performance Electronic Computer System

to cover 50% of their expenses in developing new computer series fully capable of meeting the challenge of the IBM 370 Series (a 3.5 generation computer).

2. Financial Assistance for the Promotion of the Development of Peripheral Equipment (Table 12)

Aid was given to computer manufacturers and peripheral equipment manufacturers to cover 50% of their expenses in developing peripheral equipment and terminal devices (plotters, character displays, serial printers, OCR, intelligent terminals, key to tape devices, etc.).

Table 12

(In ¥ million)

1973	1974	1975
1,030	1,400	900

(Tabl. 13 is deleted)

3. Loans to Japan Electronic Computer Company Through Japan Development Bank

The major part of computer sales is in the form of computer rentals. In order to promote the development of domestic computer manufacturers by reducing the tremendous financial burden they would otherwise have to bear under the rental system, the Japan Development Bank has been granting loans to JECC since its establishment in 1961 as a means of supplying the rental funds required. Now with total liberalization of machine and capital imports just around the corner, these loans are expected to take on even more significance as IBM and other foreign manufacturers intensify their activities in Japan. Thus, in order to insure the position of Japanese computer manufacturers in a market which is expected to expand along with the rapid advances in data processing, and to strengthen the foundation of the domestic manufacturers, the amount of loans from Japan Development Bank to JECC is being further increased.

Table 14
Loans to JECC Through Japan Development Bank

(In ¥100 million)

1971	1972	1973	1974	1975
410	200	115	225	330

4. Japan Development Bank Loans for Restructuring the Industry

In order to build up the competitive power of the domestic computer manufacturers in preparation for liberalization of the computer industry, the country's six manufacturers have been reorganized through administrative tie-ups. To enhance the effect of these tie-ups, loans will be granted to the reorganized groups through Japan Development Bank.

Table 15
Japan Development Bank Loans for Restructuring of the Industry

(In ¥100 million)

1973	1974	1975
15	Involved with Odd Budget Frame	Involved with Odd Budget Frame

Measures for the Promotion of Software

Table 16

(In ¥ million)

	Aid Against Operational Expense	Capital
1971	400	400
1972	370	450
1973	785	0
1974	996	0
1975	1,322	0

The Law Concerning the Information Technology Promotion Agency (Law No. 90 of 1970) was established with the purpose of promoting the information processing service business, the use of computers and the development and smooth distribution of computer programs. It was on the basis of this Law that the Information-Technology Promotion Agency was established on October 1, 1970 and the Plan for Improvement in Electronic Computer Usage was announced in January 1972. Other measures instituted under this Law include the compilation of a Program Register, the holding of qualification tests for information processing technicians and the granting of assistance loans for the promotion of data processing.

1. Assistance by the Information-Technology Promotion Agency

Table 16 shows the amount of funds the Agency has appropriated as aid money to be used toward buying up and promoting the distribution of computer programs and as money to be used to guarantee the debts of data processing firms.

2. Financial Assistance for the Promotion of the Information Processing Business (Table 17)

In order to promote software development and improve the productivity there-

Table 17

(In ¥ million)

	1973	1974	1975
Financial Assistance	600	1,200	1,200

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1977 Edition

A Summary of Highlights Compiled from
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(106.9 billion yen: 3.9% up) so that there are a total of six industrial categories with installations valued at over 100 billion yen. These six by themselves account for 61.0% of all computers in operation. The ranking in the 50 to 100 billion yen category runs: the Government (99.5 billion yen; up 13.0%), petroleum and chemical (93.3 billion yen: up 6.0%), iron and steel (90.0 billion yen; up 8.6%), insurance (84.8 billion yen; up 14.8%), transportation (69.6 billion yen: up 11.3%), associations and farm co-ops (68.5 billion yen; up 14.5%), local public bodies (56.1 billion yen) and universities (54.9 billion yen). The last two categories mentioned went over the 50 billion yen mark for the first time in 1976.

As in 1974 and 1975, the category with the largest average system size in 1976 was again insurance at 431 million yen (339 million yen in the preceding year; up 27%) and this was followed by government-related organization (337 million yen; up 7.3%), electricity/gas/water (260 million yen; no change), the Government (337 million yen: up 6.3%) and securities (175 million yen).

Taking a look at the state of computer operation by area, it is seen that as of March 1976, Tokyo Prefecture was first by a wide margin with 12,233 sets (up 13.9%) valued at 1,969 billion yen (up 9.4%) and accounting for 43.3% of the national total (slightly off from the 44.3% figure registered a year earlier). Next came Osaka Prefecture (6,585 sets: 341.8 billion yen), Aichi Prefecture (2,774 sets; 144.3 billion yen), Kanagawa Prefecture (1,667 sets; 186.8 billion yen), Hokkaido Prefecture (1,354 sets; 47.1 billion yen), Fukuoka Prefecture (1.331 sets; 56.7 billion yen), Hyogo Prefecture (1,206 sets; 72.3 billion yen) and. concluding the list of prefectures with over 1.000 sets, Hiroshima Prefecture (1.185 sets: 51.3 billion yen). Prefectures having less than 100 sets were Tottori Prefecture (91 sets) and Shimane Prefecture (87 sets). Tokushima Prefecture barely missed this category with 102 sets.

JAPAN'S COMPUTER POLICY

On December 19, 1975, the Minister of International Trade and Industry (Mr. Komoto) made the following informal announcement concerning the liberalization of computer imports: "On the 24th of this month, the importation of computer main units will be completely freed. This will remove two items from Japan's list of import restricted items reducing it to 27. The decision to liberalize computer imports is based on the Government's belief that, partly because of the Government's past efforts, Japan's electronic computer industry will, even after the liberalization of imports, be able to stand on its own and continue to grow."

In this connection the Cabinet resolved as follows: "In view of the high expectations held for the independence and continued growth of Japan's computer industry, the Government is resolved to keep a careful watch on trends in the computer market with the aim of preventing any great adverse effect on domestic firms which might lead to confusion in the electronic computer market." To this Minister Komoto added, "It is the opinion of the Ministry of International Trade and Industry that the independence and future growth of Japan's computer industry following liberalization will hinge on the industry's ability to secure an appropriate share of the domestic market. While keeping a close watch on the trends in computer import and installation, the Ministry will put into effect strong measures for the promotion of the domestic industry which will include but not be limited to encouraging the development of VLSI's for use in next generation computers and the securing of sufficient rental funds for domestic machines."

Thus in accordance with the basic policy set forth in the decision made in April of 1973 to carry out a fifth step in the liberalization of capital investments and imports, import of computer technology was freed from July 1, 1974, capital investments were liberalized from December 1, 1975 and import restrictions were lifted on the 24th of the same month. Then on April 1, 1976, capital investments in the software industry were freed and with this all aspects of the Japanese computer and software industries became entirely open to foreign imports and investment.

The major advanced countries of the world have shown an acute awareness of the national, social and economic importance of the electronic computer industry and, more broadly, of the information industry and all have poured great effort into the development of these industries. The Japanese Government, for its part, placed considerable importance on the information industry from a very early stage and has not only instituted measures for promoting the development of the electronic industry with private capital but has also attempted to protect the industry from excessive external pressures by placing restrictions on the import of capital, equipment and technology. This position of leadership taken by the government has complimented the efforts of private industry and protected Japan's computer industry from domination by foreign capital. As a consequence, Japan is now the only country in the world other than the United States that has its own electronic computer industry.

Let us now take a look at the steps which led up to the total liberalization of the computer industry on April 1, 1976. In 1971, the Law Concerning Temporary Measures for the Promotion of the Electronic Industry and the Law Concerning Temporary Measures for the Promotion of the Machinery Industry were consolidated under the Law Concerning Temporary Measures for the Promotion of Specified Electronic Industries and Specified Machinery Industries. Then in November of the same year, the Improvement Plan for Computers was announced. These measures set the direction and objectives of production and use of electronic computers in Japan. The fourth stage in the liberalization of capital imports had been announced in July of 1971 and called for freeing of the import of most types of peripheral equipment in February 1972 and a reduction in import duties from 15% to 13% on main units and from 25% to 22.5% on peripheral equipment effective from April 1972. Then in August of 1974, capital investments of up to 50% in computer-related businesses were freed. In the meantime, the Government reorganized Japan's computer industry into three groups and in 1972 set up the Financial Assistance for Promotion of the Development of New Computer Types as a means of promoting the Japanese computer industry through stimulation of the development of new computer types capable of meeting the challenge of the IBM 370 Series. Under this assistance program, grants covering up to 50% of the cost of developing new model computers are made to the three consolidated Japanese computer manufacturer groups.

Computer types developed by the three Japanese manufacturer groups with the 68.7 billion yen in grants made in the six years between 1971 and 1976 include the ACOS Series announced by the NEC-Toshiba group and the COSMO Series announced by the Mitsubishi-Oki group in May 1974, and the M-Series announced by the Fujitsu-Hitachi group in November 1974. These were further followed by announcements of the M 160 and 170 and the COSMO 500 in May 1975, the ACOS 800 and 900 and the COSMO 900 in April 1976, the M 150 in January 1977 and the M 130 and M 140 in May

1977. All of these machines, from the very large models down to the small models, are of comparable performance with the IBM 370 Series. The M 190, in particular, has won high acclaim as having from two to three times the capacity of the IBM 168. On the other hand, however, IBM announced its SNA oriented Series 1 minicomputers in November 1976 and then followed up with its announcement in March 1977 of its Processor 3033, a fourth generation machine that constituted a great improvement in performance over anything that had been marketed to date. This later announcement was accompanied by a simultaneous 30% cut in the purchase prices of the 370/158 and the 370/168. All in all, this sums up to a considerable intensification in international competition following the complete liberalization of computers in Japan.

Furthermore, since September 1977 the United States has been pressing Japan to make efforts toward eliminating the unbalance in trade between the two countries and as one means to be taken toward this end has strongly requested Japan to increase computer imports, use a larger number of imported computers at the Japanese government offices, and reduce import duties on imported main frames and peripheral devices.

Two programs initiated in 1972, the Financial Assistance for Promotion of the Development of New Computer Types and the Financial Assistance for Promotion of the Development of Peripheral Devices, reached completion in 1976. Recognizing the need for developing large-scale LSI's of even greater density and higher speeds, the Government followed up by launching a new program under the name of "Financial Assistance for Promotion of the Development of Large-Scale Integrated Circuits for Use in Next-Generation Electronic Computers." Under this program, the Government supplies 50% of the R & D funds used by the research association which has been set up by five domestic computer manufacturers. Government appropriations for this program were 3.5 billion yen in 1976 and 8.64 billion yen in 1977. Moreover, in order to strengthen the sales position of the domestic computer manufacturers, the Government has increased its support of Japan Development Bank loans to Japan Electronic Computer Corporation (JECC) and has set up a new program for Japan Development Bank loans for the promotion of computers combining previous loan programs for structural improvements in the computer industry and for software development with the loan program for providing JECC with rental funds. A total of 55.0 billion yen was appropriated in connection with this new program in 1977.

In the area of software promotion, the Government reviewed its 1972 Plan for Improving Computer Use and in March 1976 announced a new Improvement Plan with a target date of March 31, 1980. The new Plan calls for appropriations totaling 5.47 trillion yen by the end of fiscal 1980 and will be directed to the development of software production technology, the compilation of a program register, the conducting of qualification tests for information processing technicians and implementation of financial measures for the promotion of information processing. Aid grants extended to the Information-Technology Promotion Agency came to 1.23 billion yen in 1976 and to 1.2 billion yen in 1977 whereas appropriations for the Program for Developing Software Production Technology amounted to 500 million yen in 1976 and 850 million yen in 1977. The Agency also received information-technology promotion loans of 13.0 billion yen in 1976 and an additional 11.0 billion yen in 1977. The Ministry of International Trade and Industry, on the other hand, gave 461 million yen in 1976 and 440 million yen in 1977 as assistance toward the development of a comprehensive medical information system, 553 million yen in 1976 and 439 million yen in 1977 toward the development of a community video information system, 180 million yen in 1976 and 42 million in 1977 toward the development of an international trade information system, 3.39 billion yen in 1976 and 2.92 billion yen in 1977 toward the development of a pattern information processing system and 2.15 billion yen in 1976 and 1.77 billion yen in 1977 toward development of an overall traffic control system.

Other activities of the Government aimed at laying a foundation for the advancement of computerization in Japan include the formulation of a plan for international cooperation in computerization, compilation of a manual on system auditing, conducting of a basic survey on formation of an information network, a survey on the state of data processing, a survey on the development of systems by industry and a survey on computer deliveries and trade-ins, conducting of qualification tests for data processing technicians, compilation of a program register, conducting of studies on the legal protection of software, compilation of a register of data processing service firms and sponsoring of an annual Information Week. Also for the promotion of computerization among small business firms, the Ministry has established a Data Center for Small Enterprises within the Small Enterprise Promotion Association, set up technical data rooms on the prefectural level, dispatched data liaison personnel to the Central Meeting of the Small Enterprise Association and carried out numerous other guidance, instruction and development assistance programs.

GOVERNMENT USAGE OF COMPUTERS

Needless to say, computers and communication facilities play a highly important role in the processing, storage and transmission of tremendous volumes of administrative data. And, for a country which produces computers and peripheral devices, the use by its government of computer systems in itself constitutes a large source of demand and plays a great role in the promotion of the country's computer industry. In the United States, nearly all computers used by the Federal and State Governments are of domestic make and demand for computers relative to the development of military applications and the carrying out of large-scale Federal Government projects is particularly instrumental in supporting the computer industry of the U.S. In Britain, all central Government offices and all public enterprises in which the NEB holds shares are encouraged to "buy British" and, in fact, domestic ICL products have a 50% share of the Government market. In France, central government offices as well as those in the colonies are obligated by law to use domestically produced CII machines and, particularly since the name was changed to CII-HB, there has been an increase in efforts to promote the domestic computer industry by stimulating demand in the public sector, especially in such nationalized areas as railways, electric power, gas and banks.

Following the Cabinet Resolution of 1968, computerization has been positively pursued by Japanese government offices. Computer usage is no longer limited to the processing of clerical work at the ministries and agencies but has been expanded in scale and depth with the development of new fields of application and the use of data transmission networks to handle jobs on a nationwide basis.

The number of computers installed at government offices as of the end of fiscal 1976 was 1,401 sets (1,159 sets at the end of 1975). Of these, 267 sets were installed at

Part III:

Computer Policy and Information Industry Policy

Measures for the Promotion of Hardware

Until 1970, government promotion of the electronics industry and machinery industry was carried out under separate laws, the Law Concerning Temporary Measures for Promotion of the Electronics Industry and the Law Concerning Temporary Measures for the Promotion of the Machinery Industry. In 1971, however, these two laws were consolidated under a single law, the Law Concerning Temporary Measures for the Promotion of Specified Electronics Industries and Specified Machinery Industries (Law No. 17 of 1971). The Law specifies three types of computers requiring promotion which it designates as A-type machines (those which require research and development regarding production technology), B-type machines (those which require industrialization) and C-type machines (those which require rationalization of their production systems). In line with the provisions of the Law, the Government announced its Improvement Plan relative to computers in November of 1971 and has been conducting its promotional activities on the basis of the Plan since that time. The Plan was revised and expanded in 1975 in order to cope more readily with changing domestic and international economic conditions and to meet the changing needs of the people.

Measures carried forward during 1977 relative to hardware promotion included the following:

Also, two programs that had been implemented since 1972 were concluded in 1976. These were: Financial Assistance for the Promotion of New Computer Types, and Financial Assistance for the Promotion of Peripheral Equipment.

1. Financial Assistance for the Promotion of the Development of Large-Scale Integrated Circuits for a Next Generation Computer

IBM is presently developing a next generation electronic computer (popularly known as the FS) which will have remarkably better cost-to-performance characteristics than the present 370 Series and which will encompass revolutionary technical advancements even in its software and its peripheral and terminal devices. Japan is acutely aware of the urgent necessity to develop an electronic computer capable of meeting the challenge of the FS. The basic technological problem in the development of a comparable computer lies in the development of large-scale integrated circuits having greater density and speed than today's LSI's — that is to say, in the development of VLSI's. It is with this purpose in mind that, starting in fiscal '76, there has been set up the program for Financial Assistance for the Promotion of the Development of Large-Scale Integrated Circuits for a Next Generation Computer under which a technological research association participated in by five of the nation's computer manufacturers is given aid to cover 50% of its research and development expenses.

Table 22

Financial Assistance for the Promotion of the Development of Large Scale Integrated Circuits for a Next Generation Computer

(in ¥ million)

1976	1977
3,500	8,640

2. Loans to Japan Electronic Computer Company Through Japan Development Bank

The major part of computer sales is in the form of computer rentals. In order to promote the development of the domestic computer manufacturers by reducing the tremendous financial burden they would otherwise have to bear under the rental system, the Japan Development Bank has been granting loans to JECC since its establishment in 1961 as a means of supplying the rental funds required. Now that capital investment in the computer industry and the import of computers were completely liberalized in 1975, these loans are expected to take on even more significance since IBM and other foreign computer manufacturers are now expected to intensify their activities in Japan.

Thus in order to insure the position of Japanese computer manufacturers in a market which is expected to expand along with the rapid advances in data processing, and to strengthen the foundation of the domestic manufacturers, the amount of loans from Japan Development Bank to JECC is being further increased.

Moreover, this Japan Development Bank and, within these limits, structural improvements and funding for software equipment development will be consolidated within this system to establish a new framework for the promotion of electronic computers.

Table 23

Japan Development Bank Loans for Promoting the Computer

(in ¥100 million)

	1972	1973	1974	1975	1976	1977
Japan Development Bank Loans to JECC	150	215	325	460	470	
Japan Development Bank Loans for Restructuring of the Industry	–	15	Involved with Odd Budget Frame	Involved with Odd Budget Frame	Involved with Odd Budget Frame	550
Japan Development Bank Loans Directed to Software Development	25	25	Involved with Odd Budget Frame	Involved with Odd Budget Frame	Involved with Odd Budget Frame	

Measures for the Promotion of Software

The Law Concerning the Information-Technology Promotion Agency (Law No. 90 of 1970) was established with the purpose of promoting the information processing service business, the use of computers and the development and smooth distribution of computer programs. It was on the basis of this Law that the Information-Technology Promotion Agency was established on October 1, 1970 and the Plan for Improvement in Electronic Computer Usage was announced in January 1972. This last mentioned Plan was recently reexamined in the light of the present state of software development and other problems and a revised Plan for Improvement in Electronic Computer Usage with a target date of December 31, 1980 was announced in March 1976. Other measures instituted under this Law include a plan for the development of software production technology, the compilation of a Program Register, the holding of qualification tests for information processing technicians and the granting of assistance loans for the promotion of data processing.

1. Plan for Improvement in Electronic Computer Usage

In March 1976 the Information-Technology Promotion Agency approved a new Plan for Improvement in Electronic Computer Usage directed to promoting more extensive sophisticated use of information in Japan and thereby responding to widely held hopes for wholesome development of an information society. The target of the Plan is set for the end of 1980 by when, if the aims of the Plan are met, the total value of Japan's electronic computer installations will have reached 5,470 billion yen, 2.4 times the value of installations at the end of 1975. This represents a projected annual growth rate of 19%. The new Plan also sets new aims for program development and in particular sets the following goals: (a) development of program production technology through the development of language processors and software and improving the availability of management assistance programs, (b) advancing the level of on-line information processing by improving the availability of communication control programs, and (c) promoting the utilization of information in the community and the daily lives of the people by improving the availability of social development programs.

2. Assistance to the Information-Technology Promotion Agency

Shown below are the amounts of financial assistance the Agency has received for use in promoting the development and distribution of software and in carrying out programs for promoting the information processing service business.

Table 24

(in ¥ million)

	Aid Against Operational Expense	Capital
1972	370	450
1973	785	0
1974	996	0
1975	1,322	0
1976	1,233	0
1977	1,198	0

3. Plan for Development of Software Production Technology

In view of the good results achieved under the financial assistance program for promotion of the information processing industry which was carried out between 1973 and 1975 to prepare the Japanese software industry for full liberalization (3 billion yen in assistance over the three-year period), the Information-Technology Promotion Agency has now initiated a special program through which it hopes to develop the fundamental technology for realizing the automation of software production. This program is being carried on under a special system for commissioning outside organizations to conduct the actual research and development work.

Table 25

(In ¥ million)

1976	1977
500	850

4. Financial Measures for the Promotion of Information Processing

The "financial measures for promotion of information processing" is a system for guaranteeing loans from the three long-term credit banks. Guarantees are given for loans directed to: (1) Funds required by information processing service firms for computer installation, program development, training of information processing technicians and other matters related to upgrading information processing services and (2) Funds required by general users for program development and training of information processing technicians.(Table 26)

Tax Measures

1. Reserve Fund to Offset Losses From Computer Repurchase

Computer manufacturers are permitted to deposit an amount equal to up to 20% of computer sale price in a reserve fund to cover the loss incurred on computers which must be repurchased from JECC when the computer user cancels its rental contract with JECC.

2. Special Computer Depreciation System

In order to promote information processing and the outright purchase of computers, users who purchase computers which can be expected to contribute to improving the level of information processing (general-purpose computers having a memory unit with a capacity of over one million bits) are permitted a special 20% depreciation for the first year. By taking advantage of this system, it is possible under the fixed rate method to write off just over 50% of acquisition cost in the first year.

3. Reduction of Fixed Asset Tax on Computers

With the same aim as mentioned in (2) above, users who purchase computers having a memory unit with a capacity of over one million bits are subject to fixed asset tax at a reduced rate (4/5 of the ordinary rate) for three years from date of acquisition. In other words, such users are given a 1/5 reduction in fixed asset tax.

4. Program Guarantee Reserve

In view of the important role of the software industry in the development of an "information society," firms in this industry are allowed to set aside 2% of their total program sales to provide a reserve to cover their expenses in making modifications in programs already sold under their program warranty systems.

Table 26

(In ¥ million)

1972	1973	1974	1975	1976	1977
145	133	90	120	130	110

Table 27

(In ¥ million)

1973	1974	1975	1976	1977
220	553	804	553	439

Promoting the Development of Systems and Technology

1. Development of a Medical Information System

As a result of the combined effect of increasing demand for qualitative improvements in the standard of living and of the mounting requirements for medical service, the ability to provide medical services has become unable to keep up with the demand for them, thus creating a serious social problem.

In order to overcome this problem, it will be necessary to improve the productivity of medical services and eliminate regional disparities in quality through the development of a medical information system which applies information processing technology in combination with the latest developments in the rapidly advancing field of medical electronics.

With this in mind, the Ministry of International Trade and Industry is carrying forward a project directed to the development of a comprehensive medical information system encompassing the development of a wide range of video information processing devices for medical use and of a medically adapted computer language. During fiscal 1977, the detailed designing of 1975 and the construction of machine prototypes of 1976 was continued, with some systems reaching completion and entering the test stage.

2. Development of a Video Information System

Through the development of a bi-directional system which combines the fundamental technology of such rapidly developing fields as CATV and video packages with the computer, it is possible to provide a wide range of services encompassing CAI, facsimile and TV shopping. The effect of such a system on the daily lives of the citizens is expected to be great.

As the video information system is a comprehensive information system cutting across all aspects of life, it is necessary to proceed with the development of the system equipment and system itself through actual operation at experimental towns where the concrete, quantitative needs of the users can be grasped and the technical reliability of the system can be confirmed.

Continuing on from the prototype development carried out during 1975 and the production of subsystems during 1976, development of machines and facilities for the center was carried out during 1977. (Table 27)

3. Development of an International Trade Information System

Work is being carried forward in the development of computerized foreign trade information systems designed to speed up and simplify the processing of foreign trade-related work. Work continued in 1976 on the development of import-related application systems, supporting systems and peripheral equipment and terminal devices.

Table 28

(In ¥ million)

1976	1977
108	42

4. Development of a Pattern Information Processing System

In order to strengthen the international competitive power of Japanese computers and to respond to the demand for more sophisticated information processing methods, it will be necessary to continue research and development activities in the field of data processing-related technology.

With this aim, the Project on the Development of a High-Performance Electronic Computer which has been in progress since 1966 has been followed up since 1971 by a project directed to the development of a pattern information processing system capable of directly receiving as input, recognizing and processing pattern information in the form of written characters, the shapes of objects, voice, etc. (Table 29)

COMPUTER WHITE
PAPER 1980

Elaine

Part III:
Information Industry Policy

POLICY IN THE COMPUTER AND INFORMATION PROCESSING INDUSTRIES

1. Laws and Regulations

(1) Law Concerning Special Measures for Specific Machinery and Information Industries (Maohine & Information Industry Law)

Fig. 7 shows the changes undergone by the legal and regulatory system set up for the promotion of the information industry in Japan.

Two laws, the Law Concerning Special Measures for the Machinery Industry (Machinery Industry Law), which was enacted in 1956, and the Law Concerning Special Measures for the Promotion of Specific Electronic Industry, enacted in 1957, provided powerful support for the development of these industrial sectors which took place from the latter part of the 1950s. In 1971 these laws were combined to form the Law for Special Measures for Specified Electronic and Machinery. Industries (Specified Industries Law), a step taken to cope with the capital liberalization of the 1970s and in the light of changes in the economic situation, both in Japan and overseas.

The new law covered 37 types of machines in the electronics industry and 58 types in the machinery industry, for each of which a special promotion program was to be drawn up and required funding ensured so as to enable program objectives to be achieved. The thrust of the law was to raise the technological level in both industries and increase the degree and range of application of electronic technology to machines: that is, to integrate electronics into the machines.

However, the industries continued to face problems such as:

① technological insufficiency in advanced devices and a generally weak business base, which had to be overcome;
② some electronic component fields started to feel the competitive pressure from nearby developing countries, making rationalization to boost quality and performance all the more necessary;
③ Japan's software sector in particular was badly behind that of some other countries, and in view of the future needs for multifunction devices and systematizing of devices, it was becoming urgently necessary to develop an industry capable of meeting these vital software needs.

It was in response to these needs that the Law for Special Measures for Specified Machinery and Information Industries (Information Industries Law) was enacted in 1978 upon the lapse of the Specified Industries Law.

Many of the basic measures of the new law were the same as those of its predecessor, namely those designed for promoting production technology and rationalization. With regard to the specified industries it provides for

① improvement plans;
② tax measures to ensure the necessary funds for achieving planned targets;

nology Promotion Association approved the second phase of the Plan for Improvement in Electronic Computer Utilization, the target date being the end of fiscal 1980.

2. Council Reports on Directions to be Taken

A number of reports on what directions government policy should take to promote informationalization and the information industry, have been prepared by the Electronic Industry Council and the Information Industry Committee of the Industrial Structure Council.

Of these reports, the fundamental ones were the 1960 report which mapped out the main lines for the computer industry, the 1969 report stressing the reinforcement of the information processing industry and information processing, targetting the establishment of the Information Technology Promotion Association, and the 1974 report on the new outlook for informationalization and the information industry, following liberalization.

Recently Japan's informationalization and its information industry are undergoing major changes as the nation experiences major changes in its economic environment.

It was in light of this that in June 1980 the Information Industry Committee (chaired by Mr Hidezo Inaba), of the Industrial Structure Council, was asked to draw up a report on informationalization and the information industry in the 1980s, and related policies. The aim was to carry out an overall, comprehensive study of the problems involved in these two areas, and thereby gain a clear picture of the future as the decade of the '80s advances. Work is now being carried forward on this by three sub-committees, among which is the Informationalization Vision Subcommittee. An interim report is due in the fall of 1980, with the final report following around the spring of 1981.

3. Promotion of Computer and Information Processing Industries

A Budgetary

(1) Promoting development of basic technology for the next generation of computers (budget)

At the beginning of 1979 IBM, the industry leader, announced (and is already shipping) its 4300 processor (the E series), said to be the precursor of its Future System (FS).

Moreover, it is expected that the company will announce within a year or so a full-scale FS range, the H series. Thus computers are now in the period of transition to the 4th generation, from the present 3.5 generation. These 4th generation systems will employ revolutionary new technology, both hardware and software, providing a major boost in cost performance and a rapid expansion in functional utility.

This being the case, it has become all the more urgent that Japan develops a 4th generation computer.

Central to the hardware technology of the 4th generation system is VLSI, a greatly concentrated and enhanced version of the LSI currently in use. Development of VLSI was started in 1976 in the form of a 4-year national project, taking precedence over the development of the software. Research and development proceeded well, and the program reached completion in fiscal 1979, as scheduled.

However, software for 4th-generation systems will require major new functions not posessed by software used up till now, but Japan is considered to be lagging further behind in software development than it is in hardware, and this makes it all the more vital for the nation to develop basic software technology (operating system: OS) for network administration and very-high-level language processing.

Also, man-machine interfacing has been improved for the next generation. Computer systems that are easy to use are needed, but at the same time it is also necessary to develop new high-performance terminals and peripheral equipment that enable Japanese-language input/output to be carried out.

For this research and development funds totalling 47 billion yen are being invested in a 5-year program running from fiscal 1979 to 1983. This program, conducted under the direction of a research association (the Computer Basic Technology Research Association), is to develop OS technology and technology for new peripheral and terminal equipment, with 50% of the costs involved being subsidized. In fiscal 1980, the second year of the program, development is to be stepped up. (See Table 14.)

① Development Bank financing of JECC

The transition to the 4th generation of computers has started with the announcement of IBM's new machines. With the tremendous increase in cost performance of 4th generation hardware, it is inevitable that the sales competition will be more intense than before.

JECC was established to step up the marketing power of the domestic computer manufacturers and ensure a basis for the long-term development of the Japanese computer industry. For this purpose special Development Bank financing of JECC is being carried out on a continuing basis.

② Development Bank financing for structural improvement of computer industry

Financing is carried out to provide stable funding for the investment, by domestic computer makers, in plant and equipment, thus promoting the upgrading and modernization of such facilities and the reorganization of the system.

(2) Information processing promotional measures

① Development Bank financing of software development and EDP engineer training

Financing is provided for facilities required for software development and for training of data processing engineers.

② Development Bank financing of the promotion of information processing systematization

Financing is provided for equipment funds needed to introduce systems with a high social value for solving problems related to medical care, fraffic and transportation, disaster-prevention, livelihood, labor and the environment, and for systems for enhanced on-line use.

③ Loans for promoting computer system safety

With the increased use of computers, accompanying problems cannot be ignored, problems such as economic and social chaos that may be caused by computer breakdown, and the invasion of privacy and leakage of secrets. In view of this, MITI issued in April 1977 "computer system security measure standards" and has since been promoting these measures by arranging for loans (through the Development Bank and the Small Business Finance Corporation) of the money needed to acquire the required equipment.

(3) Financial measures for promoting information processing

These measures involve financing by three long-term credit banks while awaiting acceptance of bank debentures by the Trust Fund Bureau, on the basis of MITI recommendation. Financing covers program development requirements and information processing industry service needs.

4. Promotion of Technological Development

(1) Development of pattern information system (major project)

Research and development has been continuing since fiscal 1971 on a pattern information processing system as a new generation computer system. This system will allow pattern information (alphanumeric characters, drawings, shapes of objects, sounds, etc.) to be input and recognized for processing. Development work is scheduled to end in fiscal 1980, with the completion and trial operation of a prototype.

(2) Development of optical telemetering control system (major project)

At present electrical signals are used to measure and control information in industrial plants. A system is being developed whereby this will be done by means of optical transmissions and sensing, which will mean greater safety and quality. (Fy 1979–1986, 20 billion yen scheduled.)

5. Development of Social Systems

(1) Development of health-care network system

Numerous problems have arisen in the field of medical care in our country. They include inadequacies in the system of diagnosis and treatment and regional disparities in medical treatment. An effective means of solving these problems is to develop a medical information system which would make use of computer techniques and the techniques used in medical equipment.

For this reason, under a Five-Year Plan beginning in fiscal 1978, work has been under way in developing a "Health Care Network System" which would link together medical agencies such as hospitals, clinics, and health-screening and examination centers and which would raise the quality of medical treatment

Table 17

(Unit: Y100m)

	Fy	1974	1975	1976	1977	1978	1979	1980
Development Bank financing for computer promotion	Development Bank financing for JECC leasing	325	460	470	520	560	500	480
	Development Bank financing for structural improvement of computer industry	Other, within limit	Other, within limit	Other, within limit				
Information processing promotional measures	Development Bank financing of software development and EDP engineer training	Other, within limit	Other, within limit	Other, within limit				
	Development Bank financing for promoting information processing systems	Other, within limit	Other, within limit	Other, within limit	Other, within limit			
	Loans for promoting computer system safety				(Small Business Finance Corp.)	25	30	30
Financial measures for promoting information processing		90	120	130	110	80	70	50

MITI's Request

Joint IC Production Is Being Studied by Electronic Enterprises

here is a growing tendency among electronic component makers to consider production of integrated circuits jointly on a group basis.

This tendency has arisen as manufacturers of electronic components, such as transistors, resistors and condensers, are beginning to find the scope of their business being narrowed by the development of ICs.

The Ministry of International Trade & Industry also is advising these manufacturers to consider joint IC production as individual efforts to build production facilities are likely to prove in many cases wasteful as well as costly.

ICs in Japan are being produced by leading electronic machinery firms, such as Tokyo Shibaura Electric Co., Ltd. (Toshiba) and Nippon Electric Co., Ltd.

Small electric component makers are being compelled to go into the field of IC production because use of condensers, transistors and other components is sharply decreasing.

Some of these firms have already begun producing ICs independently.

MITI is stressing the necessity of joint production of ICs because it is afraid independent production may cause excessive competition among these component makers and lead to weakening their international competitiveness.

Under such MITI administrative guidance, electronic component manufacturers have begun studying concrete plans on joint production.

Condensers

Sprague Elec. Anticipating Joint Venture

prague Electric of the ted States, one of the leading condenser manufacturers the world, recently conferred in Tokyo with Nippon mical Condenser Co. of Toe on establishment of a nt venture for production condensers.

The Ministry of International Trade & Industry is ely watching development this negotiation as the nt venture, if actually established, will have serious ects on the Japanese condenser industry which is composed of medium and small enterprises.

According to Nippon Chemical Condenser, the tie-up negotions with Sprague Electric rted when the latter proed toward the end of last r to purchase Nippon mical Condenser's autocondenser-manufacturing equipment. When the To condenser maker refused U.S. firm's offer, Sprague ctric reportedly proposed ablishing a joint venture.

According to explanations en to the Ministry of International Trade & Industry by pon Chemical Condenser, proposed joint venture invest a total of ¥1,700-00 million ($4.8-$5.1 million) in production facilities.

Nippon Chemical Condenser ntains that as most of products manufactured the joint venture will be orted to the United States, re will be no possibility of new firm disrupting the estic condenser industry.

Mitsubishi Oil Stock Changes

Getty Oil Co. of Wilmington, Delaware, an oil refining anch of the Getty financial oup of the U.S., will replace ewater Oil Co. of New k City as the largest stockder of Mitsubishi Oil Co. rtly, according to Mitsui Oil.

This is because Getty Oil agreed with Tidewater Mission Development Co. Wilmington, another U.S. firm, on its plan to merge m into its organization as September 30.

Tidewater has so far been ding 48.7 per cent of Mitsubishi Oil's capital.

The Getty interests as a whole will account for 50 per cent of Mitsubishi Oil's capital because the group's two affiliates, Mission Corporation and Great Basin Development Corp., also hold 1 per cent and 0.3 per cent, respectively of Mitsubishi's capital.

Four Makers Seek Taiwan Phone Orders

Four leading Japanese electrical products makers—Hitachi, Ltd., Nippon Electric Co., Fujitsu Ltd. and Oki Electric Industry Co.—are reportedly planning to place a joint tender in an international bidding to be held shortly by Nationalist China for purchase of crossbar telephone switching facilities worth $20 million.

The prospective order by the Taiwan Telecommunication Administration, if taken, will become Japan's largest export of the kind so far.

Hitherto, all major Japanese electric makers producing telecommunication equipment have lost out to their Western rivals on many occasions in trying to export their crossbar-type telephone switching facilities.

Inventories Of Color TV Sets Rising

The Electronics Machinery Industries Association has announced that manufacturers' inventories of color TV sets increased by 22,200 units in June from the May figure.

Manufacturers' inventories of color TV sets have been steadily increasing since last February, chiefly because of a leveling-off of exports to the United States.

Manufacturers, however, optimistically believe that exports will pick up in the future as indicated by slight increases in overseas shipments both in May and June.

Color TV production and delivery in June stood at 96,731 units and 72,485 units, respectively, while manufacturers' inventories amounted to 84,238 units. Of total delivery, exports accounted for 19,327 units.

Matsushita Rejects FTC Price Warning

Matsushita Electric Industrial Co. last week rejected an advice by the Fair Trade Commission that it retracted its alleged resale price arrangements with dealers of its products.

FTC had sought abrogation of such arrangements on suspicion that they constituted a violation of the Anti-Monopoly Law relative to illegally maintaining prices.

The move made by the leading household electric appliance maker to turn down FTC's caution indicated that FTC now would convoke its first hearing on the case around the early part of next month.

FTC had charged that Matsushita, maker of National brand products, was observing a practice of stopping shipments of its products to retailers selling them at a low price and had set standards for rebates paid by wholesalers or agents to retailers.

It considered this to be a violation of Article 19 of the Anti-Monopoly Law on prohibitions against unfair business practices.

Matsushita officials, however, rejected FTC's warning, holding that there was no evidence of them infringing on the Anti-Monopoly Law.

The company countered in writing that FTC itself should withdraw its complaint.

West Germany Japanese Know- Communicatior

A Japanese process of producing a new kind of telephone and other telecommunication cables of polyethylene foam-covered type is expected to be shortly sold to West Germany by Nippon Telegraph & Telephone Public Corporation and Furukawa Electric Co., joint developers of the process.

The export deal recently was closed on a tentative basis with Kabel-u. Metallwerke Neumeyer A.G. of Nuernberg, according to the corporation and Furukawa. Kabel-u. Metallwerke is the largest telecommunication cable maker in West Germany.

The tentative contract reportedly is of an optional type. It gives Kabel-u. Metallwerke right to conclude a full contract, if it so desires, for obtaining a non-exclusive license to gain access to the patented "PEF (polyethylene-foamed) cable" production techniques and know-how to produce, employ or sell cables utilizing the process.

The German firm will pay $6,250 for the option. It has also promised to decide within six months from the date of signing of the tentative contract whether to conclude a full contract. If it signs the full contract, it is to pay $123,750 in know-how instruction fees and an equivalent of between 0.5 and 2.5 per cent of each domestic or foreign sale of the cables to be produced by the process in patent royalties.

The Japanese parties feel it is almost certain that the German firm will sign the full contract because it has already unofficially arranged with Furukawa to buy several units of ery, eac million making factory

Large Electron Microscop To U.S. University and Ma

Electron microscopes of 650,000 volts recently were sold by Hitachi, Ltd. to West Germany and the United States.

They are said to be the most powerful in the world.

According to Hitachi, it has lately taken an order from the Max-Planck Institut fuer Metallforschung, Institut fuer Metalphysik, Stuttgart, of West Germany for one set of the new microscope, priced at U.S. $300,000 (¥108 million), and more recently also another order for one set from the University of California at Berkeley, California. Shipments of the microscopes to the two customers are scheduled by the end of this month and the end of next June, respectively.

University of California's order is said to have been won after intense competition with such Western rival makers as Radio Corporation of America of the U.S. and Associated Electrical Industries of Britain.

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Texas Instruments Co. Is Still Insisting on Self-owned Enterprise

Texas Instruments, Inc. of the United States is still insisting on right to establish a wholly-owned integrated circuit production venture in Japan but has informed the Japanese Government of its willingness to offer a part of the shares of such a venture for public marketing in the future after its establishment.

This was revealed by Board Chairman Patrick E. Haggerty of the U.S. company in a interview with Hiroshi Kurokawa, head of the Economic Section of the Nihon Keizai Shimbun, on the occasion of the latter's recent visit to the United States.

Chairman Haggerty also revealed to Kurokawa that his company would not sell the essence of its know-how on IC to Japanese companies. Although he wanted to establish the company's Asian headquarters in Japan, he might switch the location to another Asian countries, such as Thailand, the Republic of Korea and the Philippines, if the opposition in Japan to the U.S. firm's advance proved to be too strong, he said.

Texas Instruments of the United States applied in January, 1964 to the Ministry of International Trade & Industry for establishment of Texas Instruments Co. (Japan), Ltd., wholly-owned subsidiary, in Japan at an initial capital of ¥67,500,000 (approx. $190,000). The Ministry of International Trade & Industry, however, informed the U.S. firm that its approval would be given on the following three conditions: 1) the subsidiary should be owned by the U.S. company and the Japanese side on a 50-50 investment basis, 2) use of Texas Instruments' patent rights should be "liberalized" and 3) the U.S. firm should consult the Ministry of International Trade & Industry on its production schedule for three years from the date of its production.

The matter, however, has since been deadlocked as Texas Instruments is insisting on a wholly-owned subsidiary.

Chairman Haggerty told Kurokawa that in an industry like electronics where changes and developments were frequent, joint ventures face managerial difficulties as they invariably take more time in decision-making than wholly-owned enterprises. He also said that a partnership with Japanese enterprises might encumber efficient smooth use of his company's superior management practices.

Haggerty said Texas Instruments has adhered to the principle of setting up wholly-owned subsidiaries throughout the world with only a few exceptions. He felt that a thorough review should be made of such wholly-owned subsidiaries to see whether they had any adverse effects on the economy of the countries in which they existed.

His company was not going into Japan for a quick profit and he was quite ready to clearly explain his company's position, if there was any misunderstanding over his company's intentions in Japan, he said.

Haggerty revealed that he had informally told the Ministry of International Trade & Industry that he was willing to make public part of the shares of his company's Japanese subsidiary after starting it as a wholly-owned company but that he had not yet received MITI's reaction to his proposal.

He also said that he valued highly the ability of Japanese executives and even was willing to entrust management of his company's Japanese subsidiary to the Japanese in the future. If established, Texas Instruments Co. (Japan), Ltd. would play an important role in the worldwide network of TI subsidiaries, he felt.

Chairman Haggerty declared although he was willing to sell his company's patents, he was opposed to making public the basic part of his company's know-how. He stated that the technological standards of the Japanese electronics industry was higher than those of most of European countries and are almost on an equal level as those in the United States and that the day had come for Japan to profit more from competition rather than from protectionism.

Haggerty also stated that he was greatly interested in Japan and he would like to establish his company's subsidiary in Japan.

He said that his company's policy was not to force its way into other countries as forced advances were bound to result in unhappiness for everyone. He said he would have to make a final decision shortly.

Toyo Kogyo Markets 3.5-ton New Truck

Toyo Kogyo Co. of Hiroshima Prefecture has placed on the market a new truck of 3.5 ton load capacity as an addition to its E2500 diesel engine series of smaller trucks.

The E2500 diesel engine trucks of the company are all equipped with a high-speed 77-horsepower engine of 2,522 cc capacity, jointly developed by the company with F. Perkins Ltd. of Britain.

The new truck was developed in relation to revision of the Road Traffic Law which permits elevation of the maximum hauling capacity of smaller trucks from 2 to 3.5 tons.

2 Firms Plan Reli
Control to Foreign

Two leading Japanese-foreign ventures which have been achieving good business results are planning to turn over their management control to their foreign partners if they can secure sanction of their plan by the Government's Foreign Investment Council.

They are Pfizer Taito Co., Ltd., established jointly by Taito Co., Ltd. and Charles Pfizer & Co. of New York City, and Nippon Tokushu Noyaku Seizo K.K. in which Bayer A.G. of West Germany possesses a 25 per cent capital investment ratio and ranks as the leading stockholder.

Pfizer Taito handles pharmaceutical products and Nippon Tokushu Noyaku, farm chemicals. Both are known for issuing high dividends.

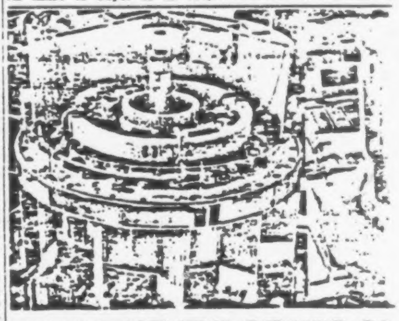
In the case of Pfizer Taito, an equally financed firm, the American partner has offered a big premium for its shares and Taito is prepared to part with as many shares as it can.

As to Nippon Tokushu Noyaku, it is willing to transfer its share to Bayer so as to elevate the latter's inves ment ratio from the presen 25 per cent to 50 in retur for securing all new far chemical know-how from th West German company.

The latest cases of Pfiz Taito and Nippon Tokushu N yaku were regarded to refle the weakness of the Japane in the face of the superiori of influential foreign firms to capital and technology. reflected also in the earli cases involving Hohnen Leve and Nichiro Heinz.

Informants understood th in the case of Pfizer Tait the Japanese and Americ partner had virtually agre on setting the price of th shares to be transferred relation to increasing Pfizer investment ratio at abou ¥1,500 (approx. $4.10) p share, or twice that of present face value of ¥500.

While Taito reportedly w ready to sell any amount shares at the premium pric the Health & Welfare Min try was said to be seeking limit the raising of Pfizer investment ratio to within per cent in line with the ea



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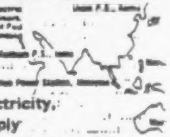

Better living means modernization through electricity, and Fuji Power plants supply electricity for the modern nations of Asia.

A country's growth levels on its basic industry. And industry depends on generating plants and turbines by Fuji, the fulcrum of progress.

Fuji's Francis Turbine, for example, is the heart of the Woh Power Plant in Malaysia and the Maria Cristina Plant in the Philippines. Industries of both Australia and India rely on Fuji Turbines and Generators for electrical power. And a major step in modernizing the economies of Korea and Peru has been the purchase of Fuji turbines. From tropical jungles to the snow-capped Andes, Fuji Electric makes the world a more comfortable plac to live in.

Fuji Electric also makes home more comfortable to be in. Peop have written us from over 1 nations telling us how satisfied the are with our products. Our compac electric shavers, fans and our gia diesel engines all have the world most advanced technology behin them. Fuji Electric maintains tec nical agreements with the world major electronic firms such as Wes Germany's Siemens AG, England The General Electric, and America RCA.

Increased efficiency in manu-

FUJI ELECTRIC CO., LTD.

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the electronic area, any has also pro- th considerable suc- urn signal," a direc- icating switch for eadlight switch and evice switches. By t year, the company cts at least a 20 per ease in its current sales of automobile t already totaling 0 million ($277,788).

Ball to Head Car Mission In December

The Government and automobile industrial circles have revealed that a U.S. automobile industry mission will visit Japan in early December.

The mission is scheduled to be headed by George W. Ball, former Under Secretary of State, and be composed of top executives of the "Big 3" U.S. automobile manufacturers—General Motors Corp., Ford Motor Co. and Chrysler Corp.

The mission is slated to hold talk with the Government officials and the automobile industrial leaders on such problems as the commodity taxes on big U.S. passenger cars and the import liberalization for engines and other major motorcar parts.

MITI Seeks Improved Computer Technology

— New Standards Studied —

Tightening of present standards on registration of domestic electronic computers for rental services for the purpose of stepping up the technology of electronic computer makers is being studied by the Ministry of International Trade & Industry for introduction by next April 1, if practicable.

Registration of Japanese-made electronic computers is one of the principal functions of Japan Electronic Computer Co. (JECC), a joint renting service of Japan's six major electronic computer manufacturers.

JECC has been handling almost all electronic computers produced in Japan for sale or renting, mostly for renting. It has been operating with the Government's special financial support.

The company, financed by the Japan Development Bank with low interest loans, buys up computers and assumes the work of leasing them.

At present, any domestically-produced electronic computer to be registered with JECC for its acceptance must, as a rule, conform to a certain criterion established on the basis of two considerations—degree of reliance on imported parts or components and amount of domestically technology employed.

The Ministry is now considering sharply tightening this standard to stimulate the technological development efforts of the computer industry.

Basically, its move has been motivated by need for building up the industry's international competitiveness in face of mounting international demands for liberalization of import on electronic computers.

The six Japanese makers now account for only 2 or 3 per cent of the world's total computer market as compared to 70 per cent for International Business Machines Corp. of the U.S.

Informants said the Ministry's new plan is already causing a stir in the industry because some makers feel that they may not be able to meet tighter standards.

ijitsu Cracks Markets America and France

Limited, a leading ımunication and elec uipment makers, has two successive orders \COM Series electron- ters from France and , the company an- recently

orders are "regarded gnificance as both are highly computer- ons.

ompany's computers eady been sold to vari- r non-Western coun- ıjitsu's FACOM Series rs have already found ay to Bulgaria, the tes, the Soviet Union Republic of Korea.

ding to Fujitsu, the om France involves a a FACOM 270-10 type r system. The buyer elin, a famous rubber cturer of Clermont- , which had already ed some of Fujitsu's ic control machinery. nit is needed for pro- instruction tapes to several sets of Fuji- NUC Series numerical electronic system in- n its plants. The unit, bout ¥11 million ($30,- s already been shipped. American order involv- set of the company's 230-10 type computer came from Control orp. (CDC) of Minnea- linnesota. The set has urchased on a sample basis. Fujitsu is looking forward to follow-up orders if the sample is found satisfactory by CDC.

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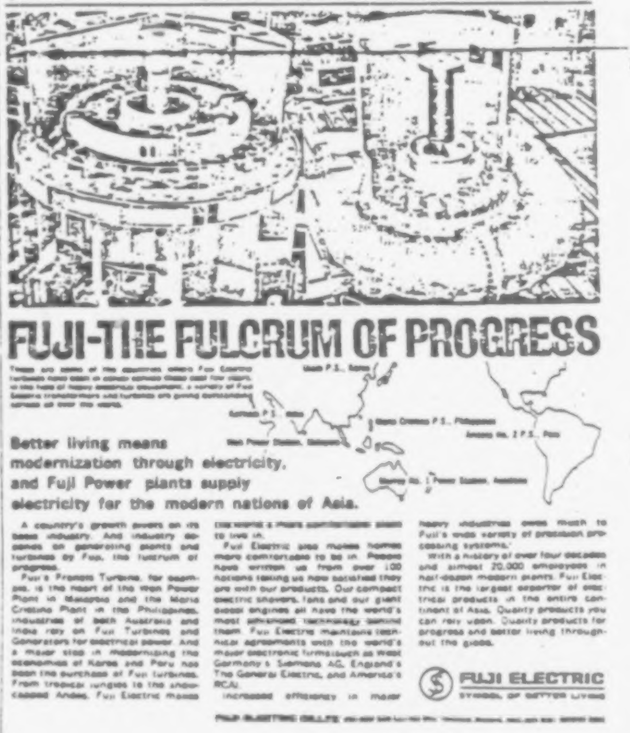
tal increases were rela- few during the term. erage dividend rate rose per cent from 8.8 per ue to dividend boosts e capital corporations. he profit increase ex- the pace of outlays for ds, however, propensity idends improved by 4.7 per cent in the Septem- rm from 65.4 per cent e previous term.



FUJI-THE FULCRUM OF PROGRESS

Better living means modernization through electricity, and Fuji Power plants supply electricity for the modern nations of Asia.

A country's growth pivots on its basic industry. And industry depends on generating plants and turbines by Fuji, the fulcrum of progress.

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Fuji Electric also makes homes more comfortable to be in. People have written us from over 100 nations telling us how satisfied they are with our products. Our compact electric shavers, fans and our giant diesel engines all have the world's most advanced technology behind them. Fuji Electric maintains technical agreements with the world's major electronic firms such as West Germany's Siemens AG, England's The General Electric, and America's RCA.

Increased efficiency in major heavy industries owes much to Fuji's wide variety of precision processing systems.

With a history of over four decades and almost 20,000 employees in half-dozen modern plants, Fuji Electric is the largest exporter of electrical products in the entire continent of Asia. Quality products you can rely upon. Quality products for progress and better living throughout the globe.

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1968

Makers Plan Production Expansion

Japan-U.S. IC Competition Due To Intensify on Domestic Mkt

By A Staff Writer

Japanese electronic manufacturers of integrated circuits appear to be heading into a new period of active rivalry with their American counterparts on the Japanese market as a sequel to the planned entry into Japan of Texas Instruments Inc of the U.S in the form of setting up a joint IC venture with Sony Corp

Although Texas Instruments and Sony still have to work out arrangements on royalties to be paid for use of the U.S firm's IC know-how Japanese makers feel that the problem of patents shortly will be resolved and their future efforts should be turned toward greatly increasing production.

Through their prospective "showdown" with their American counterparts on the Japanese market Japanese makers hope to increase their international competitiveness and eventually to develop ICs as one of Japan's best export industries

Before contacting Sony with a proposal for launching a joint venture on a 50-50 ownership basis Texas Instruments had been seeking Japanese Government permission for four years since early 1964 on its plan to start a wholly-owned IC enterprise in Japan

Texas Instruments attempt to enter Japan through such direct capital investment created a major controversy among Japanese makers similar in nature to the past entry into the local electronic computer industry of International Business Machines Corp of the U.S through its Japanese affiliate. I.B.M. Japan Ltd

The strong opposition to Texas Instruments entry voiced by Japanese makers led the Ministry of International Trade & Industry finally to specify three conditions for sanctioning its entry

They were that it form a 50-50 joint firm with another Japanese maker that it open its patents on ICs to others at a fair price and that it agree to have any joint firm temporarily abide with restrictions on production to be worked out with the Government

Texas Instruments, until its latest move to seek a tie-up with Sony, however, refused to accept such conditions

During the past four years since Texas Instruments' first approach to Japan, however, leading Japanese electric makers have striven to develop their own types of ICs or commercializing products using ICs through the technical assistance of other American electronic firms Texas Instruments claims basic or underlying patent rights

The Japanese makers now have attained a high level of technology on IC manufacture producing a considerable volume of ICs

Under such circumstances, they have altered their past stand of opposition to Texas Instruments' entry particularly in the form of a tie-up with Sony from feeling that this will lead to resolving patent problems and such a solution will open the way for their exporting equipment using ICs to the United States

Biggest headache to Japanese makers after they had developed their IC know-how and conceived new products incorporating ICs was whether they could safely export such products to the U.S without experiencing a strong complaint from Texas Instruments

Various other U.S IC makers now are expected to join the anticipated competition in Japan

Fairchild Camera and Instrument Corp., Motorola Inc. and Signetics Corp have already started production in the Republic of Korea, Taiwan and Hong Kong, and some of them have already started exporting products of such overseas enterprises to Japan They are even said to be planning to start production ventures

American integrated circuit makers predominate in international competition Even in basic IC units alone, they produced 68 million during last year, an increase of more than seven times the two year ago level Moreover, supported by defense and Space exploration needs, they are now at the threshold of producing a still more sophisticated circuit — LSI (large scale integration)

The Japanese, for all their efforts, did not produce more than 3,500,000 units last year Besides being so outdistanced, they are handicapped by their increasing financial burden to pay royalties to American companies for technological assistance.

Notwithstanding all this, Japanese makers are doing all they can to boost their competitiveness in the area of export of applied IC products, if not in basic ICs themselves.

Under the circumstances, the key to the success of the Japanese seems to lie in their efforts to develop new techniques in wide neighboring areas of the basic technology held by Texas Instruments Such efforts would probably require teaming up of various makers in production to eliminate wasteful domestic competition as now encouraged by the International Trade & Industry Ministry

Comparison of Japan, U.S. IC Output

(unit: 10,000 pcs.)

Year	Japanese Prod	[illegible]	U.S. Prod
1964	—	[illegible]	[illegible]
1965	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	

Note: Ministry of International Trade & Industry [illegible] for Japan's production and [illegible]. U.S. production figure based on U.S. Electronic Industries Association survey. Japanese figures [illegible] while U.S. figures are for [illegible] IC [illegible].

Electronic Industry Production Will Show 22% Gain in 1968

The electronic industry will continue a firm growth this year despite a gloomy business picture forecast industrywide, the Electronic Industries Association of Japan (EIAJ) said in a recent report on its outlook

The association predicted this year's total demand will reach ¥1,761,200 million (approx $4,892 million) in value, up 22 per cent from the estimated output for last year.

Much of this upsurge will come from the color television receiver and computer fields, EIAJ reported It predicted a growth of 73.5 per cent and 65 per cent in demands, respectively, for the two lines.

According to the association, production of color television receivers will total 2,150,000 valued at ¥221,500 million (approx $615 million). Some 350,000 are expected to be exported (In 1967 the output was estimated to have reached 1,240,000 sets valued at ¥127,700 million (approx $354 million) including 330,000 sets sold abroad)

As for computers, ¥202,300 million (approx $561 million) worth of demand is expected. This compares with last year's figure of ¥122,800 million (approx $340 million)

The EIAJ report noted that home electronic appliances and equipment, spearheaded by brisk sales of color television sets, would greatly increase this year and that their production would record an increase of 21 per cent to ¥723,000 million (approx $2,008 million), compared with that of 1967

While output of ordinary television sets is likely to decline 3.2 per cent this year, all other key items, such as radios and tape recorders, are expected to show a 10-20 per cent growth, the association reported For example, transistor radios are expected again to be the world's No 1 with production of 34,380,000 units, up 8.5 per cent over last year

The association also drew an optimistic picture of a 24 per cent increase in production of electronic machinery and equipment for industrial use, such as computers, communications equipment and broadcasting facilities. Aggregated production of these items is expected to reach ¥623,000 million (approx $1,730 million).

Among others, television broadcasting facilities, in particular, are likely to make a strong increase of 28 per cent as compared with 1967 This is due chiefly to projected expansion of color telecasting facilities and establishment of recently licensed UHF

(Continued on Page 14)

Mitsubishi E. Makes Small C

Mitsubishi Electric Corp of Tokyo has produced a small electronic computer for business use, called MELCOM-81 Series.

It hopes to sell the computer on an installment payment basis of about three years rather than renting it through Japan Electronic Computer Co

Excluding typewriter and input-output apparatus, it will sell for about ¥5,500,000 (approx $15,278) It falls in the class of being the smallest computers produced in Japan

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FTC Raids Two Of Air Condit

The Fair Trade Commission has raided two Japanese agents for U.S electric machinery manufacturers for alleged violation of the Anti-Monopoly Law The two firms are Tsunashima Shoten, sole air conditioner sales agent for General Electric of the United States, and Nippon Reidanbo, sole sales agent for Admiral, also of the United States

The Fair Trade Commission maintains that the two Japanese firms have violated the Anti-Monopoly Law by offering unusually expensive gifts to all buyers of their air conditioners. The existing Anti-Monopoly Law prohibits "unfair alluring of customers"

This was the first time that FTC took direct action against the companies offering expensive gifts to all purchasers of their products, although the

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Tuesday, April 9, 1968 THE JAPAN ECONOMIC JOURNAL

To Buy Domestic Types

Joint Computer Company Sets Tighter Standards On MITI Instructions

Japan Electronic Computer Co. in Tokyo, a joint sales and renting firm for six major electronic computer makers, has sharply tightened its standards for buying computers from the six firms in line with an instruction from the Ministry of International Trade & Industry.

The revision announced, effective April 1, according to the Ministry's policy to step up domestic production of computers, featured a new standard demand for as much as 95 per cent for the rate of domestically produced parts and components in the basic structure of any Japanese-built computer based on an imported production technology.

Hitherto the rate was only between 80 and 90 per cent. Other Japanese-made computers produced with Japanese developed techniques were allowed the same 80-90 per cent rate as heretofore, meaning continued freedom to use imported parts and components corresponding to between 10 and 20 per cent since the basic know-how is Japanese.

Computers principally built through foreign know-how also are subjected to such additional new requirements as use of domestic know-how for computing, memorizing and other key parts and fulfilment of a certain level of utilization of domestic products for the input and output devices.

The domestic production percentage for the basic structure—the paper tape and card input and output, line printer and magnetic tape systems—is worked out by dividing the balance between the total CIF price of imported parts and components and the purchasing price for the basic structure only by the total machine purchasing price.

FACOM 230-60

Fujitsu Ltd. Increases Production

Fujitsu Ltd. of Tokyo has started manufacturing its FACOM 230-60 electronic computers, the largest of their kind in Japan, at a monthly rate of two units for coping with the sharply growing demand.

Up to the present, the best that a Japanese electronic computer company could do was to manufacture 30-40 small electronic computers and one large-scale model a month.

According to Fujitsu, as a result of the designing, construction and inspection phases of the FACOM 230-60 completely automatized, production period has been sharply curtailed and its reliability has been highly improved.

Moreover, as the FACOM 230-60 utilizes a multi-processor system, in which two computers share memory equipment, it is said to be far more efficient than conventional models.

Some of the most important features of the FACOM computer include 1) one computer as the former uses the multi-processing system, 2) memory equipment is put to full use as two different computers use it and 3) if one computer gets out of order, the remaining computer can take over.

According to Fujitsu, only two other computer models—IBM's 360-65 and 230-60—now use this highly efficient system.

Owing to these special features, Fujitsu has been virtually flooded with orders for FACOM computers, including those from Kyoto University, Kyushu University and Kokusai Denshin Denwa Co.

The Tokyo electronic machinery manufacturer thus plans to manufacture about [illegible] FACOM computers during [illegible] 1968 or at a rate of two [illegible]

Powder Paints Developed by Two Makers

Two new ultra-modern powder paints requiring no solvent have been commercially developed in succession by two Japanese paint manufacturing firms, each with an original method.

Kansai Paint Co. of Osaka reported the development of one of the new kinds of paint last November and has recently followed it up with announcement of completion of its first plant to mass produce it.

The plant, built in the company's Hiratsuka factory in Kanagawa Prefecture, is expected to start production with a monthly capacity of 30 tons.

Dai Nippon Toryo Co., another leading Osaka paint maker, recently reported it has also succeeded in developing a powder paint and is testing it for commercial production. The company will shortly build its first plant to make the new product with the same monthly capacity inside its Yokohama factory.

Kansai Paint is trying to take out patents on its method of producing the new paint in Japan, Britain, the U.S. and France.

Fujitsu, Ltd. began marketing from April 1 a video phone. The price of one phone runs from ¥380,000-430,000 (approx. $1,055-1,194). Up to three or four circuits, it may be used with an office switchboard. The product, as one made earlier by Nippon Electric, is only for office use.

Spinning Firms Boost Research Investments

Sentiment for stepping up technological research and development spendings is rapidly spreading among many Japanese spinning companies.

The trend is being favored by the better financial status of all firms as a sequel to their business prosperity since the beginning of last year.

Two drives are now being propelled by spinning firms.

One is an almost simultaneous attempt by various companies to replace their conventional ring-type spinning frames with new machinery of the "open-end spinning system" or air-blast type recently developed in Czechoslovakia and then in Japan.

The other is their common drive to improve their existing spinning frames for greater productivity as a more practicable and immediately effective means.

For instance, Nichibo Co. and Omi Kenshi Spinning Co., both of Osaka, are getting ready for commercial application of their respective new spinning frames of continuous, automated type.

As for the open-end spinning system, Daiwa Spinning Co. of Osaka has already installed the first prototype of such machinery and started a trial run at its Fukui mill. It is hoping to announce its results by this autumn. The company imported technology, jointly with Toyoda Automatic Loom Works of Kariya, from Czechoslovakia's National Institute of Cotton Spinning late last year.

Also interested in such a system are Toyobo and Shikishima Spinning Co. of Osaka. They are now collecting for [illegible] of domestic experimental data on such machinery to find out their merits and demerits in hope of producing and trying their own machinery of this type before the year-end.

These spinning firms' capital investments in such research and development fields are already rising. Nichibo, Daiwa, and Kurashiki Spinning Co. of Osaka are already spending two to two-and-a-half times as much for such purpose as last year and Shikishima three times.

Satellite Ground S Granted to Nippon

Nippon Electric Co. of Tokyo recently received an order for a complete set of facilities to build a communications satellite ground station from the Ministry of Posts, Telegraphs and Telephones of Kuwait.

The ¥1,820 million (approx. $5 million) order was won by NEC in stiff international competitive biddings with American, British and joint U.S.-Japanese makers in Feb-

Tie-Up—

(Continued from Page 7)

that of U.S. Steel Corp. and its affiliate, American Bridge, and that of Bethlehem Steel Corp. and its subsidiary, Bethlehem Construction.

The new drive in the Japanese steel industry is believed to represent one of the pressing needs for major steel firms to enlarge their business through diversification into more lucrative fabricated steel goods production and construction services.

Tuesday, April 23, 1968 THE JAPAN ECONOMIC JOURNAL

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With View to Cut Later

IC Firms May Agree To 3.5% Royalty Asked By Texas Instruments

Major Japanese makers of integrated circuits are reported to be moving in the direction of shortly concluding a contract for paying Texas Instruments, Inc. a royalty amounting to 3.5 per cent of sales for use of the U.S. firm's patents on IC manufacture.

Informants said that in return for paying such a royalty, the Japanese makers, including Hitachi, Ltd. and Tokyo Shibaura Electric Co. (Toshiba) appeared to have induced Texas Instruments to limit the contract period to four years with an implication that the royalty rate might be reduced thereafter.

The talks relative to use of Texas Instruments' patents which have been under way between the Japanese makers and TI through the Electronic Industries Association of Japan ever since TI's decision to set up a joint IC venture in Japan with Sony Corp.

As for the Japanese makers, they already have agreed to pay Western Electric of the U.S. 2 per cent of sales for its basic patents on ICs and similar 4.5 per cent to Fairchild Camera & Instrument Corp. of the U.S. for the latter's patents on IC manufacture.

These two royalties together amount to 6.5 per cent.

From such considerations, the Japanese makers are said to have initially strongly resisted the additional 3.5 per cent rate by TI but eventually to have backed down as their earlier deal with Fairchild had established more or less a standard for judging TI's demand.

However, informants said that they managed to leave room for seeking a royalty cut when the contract comes up four years from now and were intending in the future also to prevail on Fairchild to agree to a royalty cut.

It is believed that TI and Sony will seek formal Government approval of their planned joint IC venture when TI concludes its patent use talks with the Japanese makers.

As for Japanese manufacturers of electronic equipment, they were understood to be preparing to tackle full-fledged exports of desk type electronic computers and other equipment employing ICs to the U.S. as soon as the patent problem with TI is cleared up.

Makers of ICs thereafter were intending to exert utmost efforts to reduce IC production costs so as to strengthen the international competitiveness of Japanese products employing ICs.

While Japanese makers of ICs do not feel that they can now compete with the U.S. in manufacture of ICs alone, they judge that they can bring down their costs eventually in relation to relatively cheaper wages and in taking into account proven Japanese versatility in applying know-how to commercial products so as to outstrip the U.S. in this field within a few years, just as demonstrated in the case of transistors in the past.

New Uses Are Sought For Magnets

Japanese magnet makers [illegible]ly have begun to turn [the]ir attention actively to finding new industrial uses [of] magnets.

The search for more possibilities of application is inspired by the increasing labor shortage, automation of production processes and rising demands for more efficient and easier to operate mechanical products.

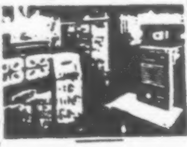
Hitachi Metal Industries of [illegible] a leading magnet maker was the first to enter into [the] field of applied magnetic product manufacture.

It is now producing and selling about ¥30 million (approx. $83,333) worth of such products a month, five times as much as at the beginning of its venture. Its products include a "refrigerating oil cleaner" to remove ferrous impurities mixed in such oil now being used in machinery and a "magnetic separator" to pick out ferrous mixtures in cereals and mineral [illegible].

The company hopes to increase its monthly sales to at [illegible] ¥100 million (approx. [illegible]) in the next five [illegible].

Apparently inspired by Hitachi's performance, various [illegible] makers are following [illegible] Mitsubishi Steel Manufacturing Co and Japan Special Steel Co to launch a joint [illegible] by securing know-how [illegible] Frey Magnetics Co. of [illegible]

Data Center Announces Novel Printing Device



The Japan Information Center of Science & Technology has announced development of a new electronic computer system combining use of a special "kanji" (Japanese character) printer that greatly speeds up cataloging and retrieval of information in printed form.

Information pertaining to contents of magazines cataloged in Japanese characters in punchcard form is quickly retrievable in printed documentary form through use of this new system.

The center, which is a semi-governmental organ of the Science & Technology Agency, yearly receives about 7,000 magazines published in Japan and abroad as well as about 4,000 reports.

The new system stands to reduce time required for processing such data into documentary form to half of its ordinary method.

It combines use of an electronic computer made by Fujitsu, Ltd. and a special "kanji" printer device developed by Nippon Denshi Sangyo.

The printer is capable of reproducing 3,071 letters or numbers, including 1,861 "kanji" characters, others forms of Japanese syllabary, English and Russian words.

It is said to have an average printing speed of 200-400 letters per second and a maximum speed of 1,500.

Sud Aviation Seeking—

(Continued from Page 1)

company with engines, electronic instruments and other equipment.

Sud Aviation also was reported to be eyeing Japan as a possible market for the "A300"—so-called air bus type of passenger plane—which it is now jointly developing with British and West German plane makers.

Informants said that Sud Aviation appears to have suggested joint developing of an air bus plane to Nihon Aeroplane but such collaboration appears to be difficult to realize from technical and geographical reasons.

As for developing medium size helicopters capable of carrying 10 persons, the French company reportedly was due to dispatch an executive of its helicopter division to Japan on May 3 to take up this issue with Kawasaki Aircraft.

Meantime, the French aviation industry's interest in the Japanese market was regarded to be very keen from the fact that 30 companies are now taking part in the aviation show now being staged in Tokyo by the French electronics industries federation. The industry last March had invited 10 Japanese aviation industry representatives on an inspection tour of about 20 French aviation plants.

Soviet Agency

Marubeni-Iida Co., a leading Osaka traders, has signed an agency service contract with V/O Licensintorg of Moscow, under which it has been given right to act as the Soviet technology and import corporation's sole Japanese agent for export of Soviet chemical industrial techniques to Japan.

Lumber Project For Mitsui Co.

Mitsui & Co. has decided to go into lumbering on Buru Island in Indonesia and export lumber to Japan from next fall.

The Japanese trading firm will cooperate with the Indonesian Government in developing lauan wood and ship about 10,000 cubic meters of timber annually to Japan.

Although this negotiation originally started about two years ago, it was suspended for a long time because of the political unrest in Indonesia.

Mitsui & Co. is slated to establish a joint development [illegible] from [illegible] of venture in Indonesia [illegible]

Tokyo Electric Imports A-Reactor from GE

Tokyo Electric Power Co. has signed a contract with General Electric Co. of the United States to import basic equipment, including an atomic reactor and turbines, for the No. 2 power generator at its Fukushima Atomic Power Station.

The final delivery date of the equipment is March, 1973. The penalty rates for delivery delays are 0.15 per cent of the price in case of delays up to three months, 0.1 per cent for delays from three months to six months and at 0.45 per cent for delays from six months to 12 months.

Tokyo Electric Power has not announced other details, such as safety responsibility

Nuclear Fuel Reproc
Concluded with Brit

Japan Atomic Power Co. recently signed a contract with Britain's Atomic Energy Authority on obtaining latter's service for reprocessing nuclear fuel used in its first nuclear power plant now in operation.

The company, jointly owned by Japanese electric power and nuclear engineering firms, will have AEA remanufacture 100 tons of uranium fuel used

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JECC Finds Computers Supplied for Renting Are 90% Japan Made

Japan Electronic Computer Co., a rental firm jointly established by six domestic electronic computer makers, has found that most of the machines supplied to it by six leading makers are built up to 90 per cent with Japanese-made materials.

JECC investigated electronic computers listed for its use by the six makers in connection with the recommendation made sometime ago by the Electronic Industry Council that JECC's selection of machines from fiscal 1968 should be governed by the standard that they were made up to the extent of 90 per cent or over with domestically available material and parts.

The computer rental firm said that all of the computers for which qualification checkups were sought by JECC were found to live up the council's standards with the exception of some reservations.

The checkup revealed that domestic makers which earlier had relied heavily on foreign technology had made considerable progress in building their machines with Japanese materials and parts in the period of approximately two years after the Ministry of International Trade & Industry had first mentioned the 90 per cent domestic construction ratio as a target.

The council had recommended that from the current fiscal year, JECC should limit its handling of machines registered with it to systems (main computer and standard related equipment) to those made with over 90 per cent of domestic materials.

As for electronic computers developed with foreign technology, the council recommended an additionally stiffer term that over half of the elements comprising the key phases of such systems relating to performance and memory devices should be made with domestic know-how.

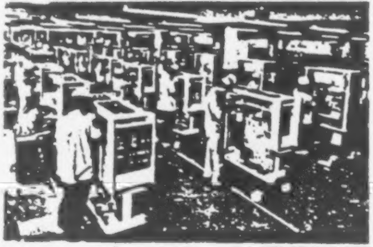

Photo: Mass production of Fujitsu's FACOM 230-10 computer.

By NTT with Fujitsu, Ltd.

Precedent Set for Separate B Of Data System Operating Tecl

The Nippon Telegraph & Telephone Public Corporation recently decided to buy a data communication electronic computer system and the accompanying "soft ware" (applying and operating technology) for a national banking federation from the maker of the system under two separate contracts.

It is the first case of purchase involving buying of know-how independently of the system proper.

Apart from the principal machinery proper (hard ware) purchase contract, the corporation will sign an independent contract at a total estimated price of ¥100 million (approx. $277,788) for the application phase of the soft ware concerned with the maker, Fujitsu Limited, which is to supply the entire system and know-how to the Local Bankers' Association in Tokyo. The federation is one of the first subscribers to the corporation's new data communication service opened recently in the interest of the domestic business and industrial world.

Evaluation of the "invisible" technology to use or apply any electronic computer system in purchasing or selling such system is not yet clearly established as a commercial pricing practice not just in Japan.

In Japan, where there has been no traditional practice to give a clear evaluation to invisible products, such as ideas, an attempt of this kind has been particularly unfamiliar.

No Japanese computer maker has ever thought it feasible in such a social climate to try to account for the soft ware part of his computer system separately from the system proper in evaluating and pricing the system for sale. Whatever commercial estimation made of such invisible know-how ever made has been simply counted into the whole price of the system without any clear differentiation.

Moreover, sales and renting competition has grown so intense among Japanese computer makers that the soft ware involved in every computer system has been often unfairly underestimated in the interest of price reduction, all for the purpose of undercutting rival products.

Observers expect the corporation's pioneering attempt to create an independent practice of soft ware evaluation in commercial transactions against such a trend to

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Computer 'Translation' Claimed By University

Kyoto University's Department of Engineering is reported to have succeeded recently in producing a machine using an electronic computer which can translate English into Japanese and also verbally communicate written Japanese.

While various electronic research organizations up to now have been undertaking work to develop translation machines and those which can "read" and convert documents into voice, Kyoto University is said to have developed two units—one for translation and the other for voice—which may be coupled for use.

When the translating machine is fed with a tape containing English in punched form, it "reads" the tape and transmits impulses to an electronic computer which has memorized words, idiomatic phrases and grammar.

It then begins printing the translation into romaji or kana characters. It is said to be capable of translating 20 English words in 30 seconds.

At the present time, its memory "brain" has been fed with approximately 8,000 basic words and technical expressions for use in translating technological documents.

It cannot effectively translate complicated or ambiguous grammatical sentences or words.

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New Toshiba Color TV Set

Japan's first 12-inch color television set will be placed on sale by Tokyo Shibaura Electric Co. (Toshiba) by May 10. It will be the smallest of its kind so far be sold in the country.

The company's sale of its new "12CP" color TV set is expected to prompt many other Japanese electric appliance makers to come up with rival products.

Hayakawa Electric Co. and Sanyo Electric Co. have made known plans to market their own TV sets of the same small size before long.

Toshiba will price its new TV set at ¥120,000 (approx. $333).

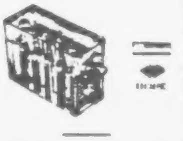
Some observers consider the price somewhat too high because two 15-inch equivalents already being sold by Victor Company of Japan and Hayakawa Electric are priced at between ¥128,000 and ¥129,000 (approx. $355-358).

New Battery Combines Air & Aluminum

Furukawa Battery Co., Ltd. of Hodogaya-ku, Yokohama has announced development of a commercial battery that employs air as "fuel" and aluminum as generating material.

General Electric of the U.S. last year had revealed development of a magnesium-air battery for military use.

Batteries of such a type have keenly attracted makers as they are said to produce relatively high output while being small in size and light in weight.



Furukawa's new battery was said to possess a higher output than GE's version, to be less costly and suited particularly for emergency and recreation use.

The aluminum-air battery was developed by Furukawa in joint research with the Science University of Tokyo.

The company said that the six-volt (1.5 watt) battery that it plans as its main product lasts for 40 hours, or equivalent to about 30 dry cells of 1.5 volts.

It also said that its weight efficiency (output per given weight) was over treble that of GE's product. While its price has not yet been fixed, it was expected to be comparatively cheap as its electrode is made of aluminum.

THE JAPAN ECONOMIC JOURNAL Tuesday, November 19, 1968

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ric Power Co. and other electric power utility services have also started similar moves.

Tokyo Electric and Kansai Electric have so far set 1.8 and 1.9 and 2 per cent as maximum sulfur content of the heavy oil they have been purchasing from domestic oil refineries for burning in their thermal power plants.

Under the increasing pressure of public outcries, however, they have found their current use of low sulfur heavy oil far from adequate in volume and recognize the need for acquiring still lower sulfur content crude or heavy oil. The Minas crude and heavy oil average 0.1 and 0.2 per cent, respectively, in sulfur content.

They are also eyeing crude oil from the Murban oil field in the Arabian sheikdom of Abu Dhabi which averages around 1 per cent in sulfur content. Mixed use of such oil with ordinary supplies is being considered.

Japanese oil refining industry circles fear, however, that such a scramble for low sulfur oil might send up already high import prices because such oil is still limited as to supply.

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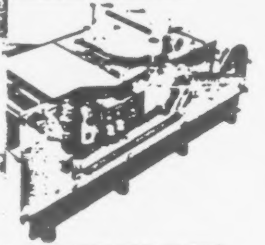
The company says the system may be used not only for recording but for copying a large amount of video tapes or magnetic tapes used for electronic computers as to be of great use for the information industry.

The new magnetic printer was said to permit high-speed copying with far better sound quality than conventional types.

Ricoh was hoping to sell the machine to the United States for teaching machine purposes.



new magnetic printer for sounds

MITI Plans To Restrict IC Makers

The Ministry of International Trade & Industry has decided on a policy of holding down entry of new makers into the field of producing integrated circuits requiring licensing of know-how from Texas Instruments of the U.S. with the aim of the strengthening the international competitiveness of domestically developed ICs.

It is also hoping to promote use of domestically made ICs during the next fiscal year by holding tests of commercially sold domestic and foreign ICs with the object of making it known to users that many of the domestically made ICs are equal, if not superior, to those that are being imported.

MITI plans to limit makers of ICs and build up IC production to an international scale since imports of ICs have been steadily increasing.

Nine companies, including Hitachi, Ltd., Tokyo Shibaura Electric (Toshiba), Mitsubishi Electric and Sony Corp., so far have won official sanction to secure patent licensing from Texas Instruments to produce the latter's versions of ICs.

The Ministry hopes to foster quantitative production of general purpose IC semiconductors by holding down the advance of new makers into this field, though it regards manufacture of special types as an exception.

The greater part of the general purpose ICs now made in Japan are being used for desk type electronic calculators and computers, radios, tape recorders, other electric appliances and communications equipment.

MITI wishes to propel greater mass production of Japanese ICs as it notes that IC use is due to spread to many other fields in the future.

Massive Microscope Purchased by Britain

Hitachi, Ltd. recently announced that it had sold a 1 million-volt electron microscope to Berkeley Nuclear Laboratories of Britain's Central Electricity Generating Board.

It constitutes Japan's second successful export of a commercial electron microscope having the biggest capacity in the world.

Japan Electron Optics Laboratory Co. earlier had won an export contract for a similar capacity microscope from Sweden's national material testing research institute.

Influential foreign makers of electron microscopes, such as Radio Corporation of America and Philips of the Netherlands, so far have succeeded in producing commercial models having a capacity of less than 500,000 volts.

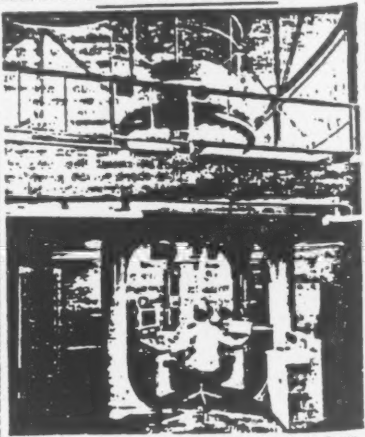
The order was won in an international tender held in August.

The value of the order was put at $516,000, with delivery set for December, next year.

Hitachi last year sold a 650,000-volt microscope to Max Planck Institute of West Germany and another of the same capacity to the University of California.

As for JEOL, it has been exporting electron microscopes to the Soviet Union and Communist Bloc countries aside from its sale of a gigantic model to Sweden.

Industry quarters noted that Japan now ranks first in the world in producing electron microscopes.



One of the massive electron microscopes made by Japan.

Computer Firms Reach Agreement

Mass Output of 7 Standard Items Planned

Six leading Japanese electronic computer manufacturers have reached basic agreement to concentrate on production of seven virtually standardized input-output devices from the next fiscal year.

However, they still need to determine how such manufacture will be allotted among the makers.

The makers are Fujitsu Ltd., Nippon Electric Co., Hitachi, Ltd., Tokyo Shibaura Electric (Toshiba) Co., Oki Electric Industry Co. and Mitsubishi Electric Corp.

The agreement among the manufacturers was reached with the assistance of the Ministry of International Trade & Industry which has advocated such a policy for building up the international competitiveness of the industry to a stage of being able to cope with liberalization of the industry to foreign investment within the next few years.

It envisages forming a type of rationalization cartel for promoting concentrated production of input-output devices.

The seven devices involved include paper tape or card readers, their performation devices and IO typewriters, all of which are virtually standardized already and are generally recognized as being typical by the makers.

Plans at present call for two makers taking charge of one device, in principle, though this may be widened to three makers.

The makers agreed to mutually collaborate as concentration on production of a few selected machines would bring down costs and also serve to eliminate needless competition among them.

However, informants believed that the question of assigning the devices to makers stood to become a problem since it directly affected their individual interests.

This indicated that reaching of a final agreement among the makers on their production assignments was still going to take some time.

Insurance—

(Continued from Page 4)

a surplus of ¥3,800 million (approx. $10.5 million).

MITI estimates that contracts in fiscal 1968 will reach around ¥1,850,000 million (approx. $5,139 million).

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JECC Restricts Rental Types

Computer Companies Are Facing Increasing Financing Difficulties

Fund stringency lately has begun to intensify among domestic manufacturers of electronic computers, particularly as a sequel to the step taken by Japan Electronic Computer Co., a joint rental firm set up by six makers, to stop rentals of small computers from March 1.

The decision by JECC to drop small computers from its rental list is compelling those which hitherto had relied considerably on JECC financing in order to maintain or expand their share of the market.

JECC, from March 1, halted rentals of 13 types of small computers whose monthly rental charges are less than ¥1,500,000 (approx $4,167). The step has particularly affected Fujitsu, Ltd., Nippon Electric Co. and Tokyo Shibaura Electric Co. (Toshiba).

In the case of Fujitsu, JECC's step has involved sales of its FACOM 230-10 and FACOM 270-20. These two small versions up to now had constituted approximately 30 per cent of its total sales, meaning that Fujitsu faces urgent need for securing other sources for financing their sales.

Fujitsu plans to carry out an equipment investment of close to ¥22 billion (approx $61.1 million), on a completion basis, during fiscal 1970, starting April 1.

To achieve this target, it intends to increase its capital by 50 per cent with payment set for July 31 as to secure a fund of ¥9,470,800,000 (approx $26.3 million) but faces need of covering the rest with owned funds or borrowings.

As one step for getting around such a fund shortage, Fujitsu is hoping to utilize the "computer trust" system inaugurated recently by Toyo Trust & Banking Corp. and Yasuda Trust & Banking Co.

The new system in effect takes the form of the makers selling their computers to the trust banks which in turn will lend them. However, informants felt that a problem loomed here as the banks were known to be disinclined to accept small computers.

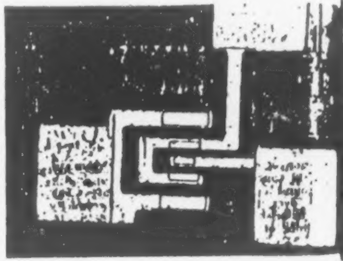
As for Nippon Electric, its small computers — NEAC 1200 Series and NEAC 2100, NEAC 2200/50 — also constitute about 20 per cent of its sales. While it has decided to handle their rental by itself from now on, this means that it will have to secure a financing fund of about ¥1 billion (approx $10.4 million) to do so.

Hence, while its equipment investment in fiscal 1970 will show an increase on a payment basis, it will have to hold this down on a construction basis to about ¥20 billion (approx $55.5 million), or about the same level as as that for the current fiscal year.

Oki Electric Industry Co., Mitsubishi Electric Corp. and Hitachi, Ltd. are virtually unaffected by JECC's decision on small computers.

However, Tokyo Shibaura Electric Co. (Toshiba) possesses three types of small computers which have accounted for about 30 per cent of its total sales. The company recently formed a new company, Toshiba Computer Service Co., for handling rental and sales of two of the three small computers—TOSBAC 1100 and TOSBAC 1500.

Besides such individual financial stringency, the six domestic makers face need to supply additional financing funds to JECC as the latter plans to increase its capitalization of ¥23,025 million (approx. $63.9 million) by 50 per cent during fiscal 1970.



Hitachi, Ltd. Develops Ionizing Technology For Semiconductors

Hitachi, Ltd. recently said it had developed for the first time in the world an automatic process of producing transistors, diodes and other semiconductors by injecting their required impurities in ionized form. Similar methods are said to be still under development in the U.S. and elsewhere.

A great amount of saving and even unm operation of such se ductor production lin be expected with use new process.

Semiconductor manuf. dominated by U.S. tec gies has so far been d ent on the manually op "thermal dispersion p for mixing such impu including boron and phor, into semiconduct terials like pure silicon stals. Such impurities semiconductors their characteristics.

Hitachi has sought mestic and several f patents on its new that involves turning impurities into ions, acc ing the ions by a hig age electric current an

Steady Expansion Seen In Usage of Computers

Computer usage in Japan is steadily expanding in scale. The average computer ownership of offices, both public and private inclusive, was 3.8 sets at the end of September [illegible]age Development Institute in a report of its fifth annual survey on computer utilization.

The association of comput

A bank

On Production, Sales, Research

Toshiba & General Reacl

Tokyo Shibaura Electric, a [illegible] electric machinery [illegible]turer, and General [illegible] a medium size electric [illegible] maker, have come [illegible] agreement to go into overall tie-up in produc[illegible], sales, researches and [illegible]development.

Both firms have established special committees to formulate concrete measures to [illegible] the agreement into force. Tokyo Shibaura Electric's [illegible] is headed by Executive Director Masao Na[illegible], while General's is headed by Vice President Mitsuga [illegible].

Although the details of the tie-up are to be worked out by the two committees, the two firms are planning to introduce a "division of labor" system in their production of radios, televisions and other household electric appliances, [illegible] redundant investments [illegible] technical cooperation and to bolster their sales [illegible] through a merger [illegible] the two firms' existing [illegible] systems.

Tokyo Shibaura Electric [illegible] General Corp have been [illegible] partners for some time [illegible] annual transactions [illegible] in Braun tubes (for [illegible] and vacuum tubes) [illegible] at about ¥3 billion ($8.3 million).

[illegible] reasons why the two [illegible] have decided to go into [illegible] tie-up include: 1) a sharp rise in the number of household electric appliances being produced by Tokyo Shibaura Electric and the resultant necessity to establish a firm parts supply route etc. and 2) the advisability of avoiding redundant equipment investments now that nearly 30 electric machinery manufacturers are advancing into production of such "post color TV" products as electronic cooking ranges and VTRs (video tape recorders).

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USSR Purchases C

Tokyo Shibaura Electric Co. (Toshiba) recently succeeded in selling 800 electronic calculators to the Soviet Union. The volume is unprecedently large for an order of its kind given by the country to Japanese manufacturers.

Encouraged by the success, Toshiba has begun seriously to solicit more orders from the USSR. At present, it expects it will be able to export 1,200 more calculators this year.

Toshiba hopes further that its exports will pave the way for it to set up a foothold in the country to supply the calculators on a long term basis.

Industry experts felt that not only Toshiba but several other Japanese and foreign manufacturers are planning to advance into the Soviet cal culator
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Tuesday, September 29, 1970 THE JAPAN ECONOMIC JOURNAL [illegible]

Cheap IC Selling by U.S. Firms Posing Problem; Dumping Mooted

By A Staff Reporter

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Major American IC makers also are engaged in setting up their plants in Southeast Asian countries in search of cheap and abundant labor.

They are aiming at promoting division of labor on an international level by having the plants abroad handle the end production processes of assembly and processing of ICs which are especially of a labor intensive type.

Motorola and Fairchild have built large IC plants in the Republic of Korea, while other American makers have advanced into Taiwan, Singapore and Hong Kong.

Through such moves, reduction in costs for producing ICs is being carried out at a rapid pace.

American makers are focusing their attention on Japan as an influential market for ICs, along with the United States.

Japan imported 13.2 million ICs in the last January-June period. Nearly half of them, 6.5 million units, however came from such Asian nations as Taiwan, Republic of Korea, Hong Kong and Singapore. The Asian-made ICs Japan bought increased six times in volume of the like figure a year ago, according to customs report of the Ministry of Finance.

They are aiming at increasing their share in Japan, which is a new market.

While launching a low-price offensive, they also are waiting for the chance to advance directly into Japan.

Among the American makers, Fairchild and National Semiconductor, in particular, are showing much interest in making advances into Japan.

Both of them advanced into the Okinawas just prior to the announcement of the Japan-U.S. joint communique late last year on the islands' reversion to Japan.

They are showing a stance of putting into practice their plans for advance at a fast pitch since Texas Instruments, their rival, already has succeeded in entering Japan.

A total of 30 million pieces of ICs were produced in Japan in 1969. They amounted to ¥26 billion (approx. $72 million) in value, or about one-fifth that of the U.S.

Demand, however, has increased at an explosive rate. It is estimated that demand in 1970 will increase by three times the figure for last year and that Japan will grow into a big market in 1973 with demand aggregating ¥170 billion (approx. $472 million).

This is because production of electronic desk-top calculators, the chief users of ICs, has increased sharply.

Also, color TV sets using ICs have appeared. It is believed that Japan will move ahead of other countries in the future in use of ICs for electric appliances.

Besides, the IC market in Japan has started showing signs of expanding with utilization of electronic parts for computers and cars.

Meanwhile, the Ministry of International Trade & Industry and the Ministry of Finance have launched probes in respect to the low-price offensive of the American makers on the suspicion that it constitutes an act of dumping.

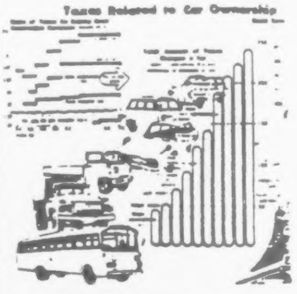
As of the present time, they are refraining from making known their official views.

But they believe that the dumping charge may rise to the surface if the cheap sale of ICs continues further.

In Japan, the system for prevention of dumping is being operated on the basis of the anti-dumping provisions of the Customs Tariff Law.

Up to now, however, the system has not been applied.

Accordingly, if the action taken by the American makers are judged to be an act of dumping, it will become the first time that the system will be applied in Japan.



Being a car owner in Japan requires paying a … both direct and indirect. On getting a car, one … auto acquisition tax. He also is levied annually a … which varies according to the type of car he posses… the prices of fuels he buys include such addition… gasoline tax and gas-oil tax. In all, one pays u… ¥240,000 (approx. $666) a year for a truck for… and ¥90,000 ($250) for a passenger car for pr… cording to a Construction Ministry calculation … a move is afoot among Government agencies and … Democratic Party to institute a new tax costing … prox. $140) on average yearly for a car for secu… railway construction revenues. If it becomes law … is likely further to brake auto demands, which … become stagnant.

Moves on Textile T

(Continued from Page 1)

should be determined by the U.S. on the basis of orderly marketing rather than on the basis of confirmation of injury.

As the Government has considered the plan reflecting U.S. intentions, it has begun persuading industry quarters to accept it as a final plan for solving the textile issue.

Prime Minister Sato reportedly intends to seek a meeting shortly with Shinzo Ohya, president of Teijin Limited, and Keidanren leaders to secure their understanding on the plan.

Informants believed that the Japanese Government had decided to seek a reopening of the talks for halting the Japan-U.S. "economic war" which has begun to spread swiftly into fields other than textiles during the three months since the collapse of the talks.

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Ford Slated to Get Share in Toyo Kogyo—

(Continued from Page 1)

stocks in the future either through the stock markets or through negotiations with other big stockholders.

Toyo Kogyo maintains that it is now not in a position to give promise to Ford Motor that it may increase Ford Motor's capital participation ratio in the future through such means as a special capital expansion.

The reason why Toyo Kogyo precipitated its tie-up with Ford Motor contrary to its earlier statement that the success of the tie-up was fifty-fifty at best is that the company has finally come to an unequivocal conclusion that the tie-up is to the good of the company. This conclusion has been gradually reached through repeated negotiations with Toyo Kogyo's main financial backers and big stockholders.

Upon final signing of the tie-up contract, Toyo Kogyo and Ford Motor will embark upon an extensive technical cooperation program, including mutual use of patents and exchange of technical information etc.

Toyo Kogyo executives say that the mutual use of patents will in principle be free of charges and cover completely new patents still not released to other firms.

Through this technological tie-up, Toyo Kogyo is planning to bolster its anti-pollution programs and promote its new product development projects.

Another plus factor of this technological tie-up is the virtual elimination of Toyo Kogyo's fear of fringing upon Ford Motor's rights in the field of exports.

The tie-up also is a benefit for Ford Motor as Toyo Kogyo has superior technologies in the field of rotary engines. Through various joint development programs, Ford Motor will be able to fully utilize Toyo Kogyo's technologies and production facilities etc.

As to management participation in Toyo Kogyo by Ford Motor, a rough agreement seems to have already been reached, although finer details, such as the scope of rights of Ford Motor's directors etc. are still to be worked out.

Toyo Kogyo originally proposed to have only one full-time director and one outside-the-company from Ford Motor.

al Aerospace Laboratory recently carried out hat of Japan's first experimental VTOL type experimental plane managed to float upward about om ground and remain suspended in air. It made up after going through all motions, such as rolling t. The test plane—flying test bed—is still a crud g two lift engines on a metallic frame shaped lik

sui S&E to Obtain pp Drain Technology

ipbuilding & En- o recently signed with Fried Krupp West Germany on its unique drain echnology that is duce no sediment- hatever.

ing to Mitsui, cess represents an g departure from all conventional drain tre ment technologies that le to mud sedimentation th poses another clearance p blem.

The new "Kaisei" proce according to Mitsui, featur use of a special catalyst turn all injurious substanc found in drains into harml gas and simultaneously move all traces of color from such dirty water.

The catalyst mixed such water, namely, oxidi all organic and inorganic jurious matter contain therein in a short space time and the resulting carb dioxide, nitrogen, sulfur oxide and other gases simply vaporized into the ai

Under the contract, Mit has been licensed to ap the new process to productio of drain treating pla throughout the Far E Mitsui will make a down ment of ¥30 million (appr $83,333) and also pay equivalent of 5 per cent of sales proceed of each plant system in royalties.

As soon as the contr takes effect, subject to Ja nese Government appro Mitsui S&E plans to st soliciting orders for plant in tie-up with Mitsu Co., its sister trading ho

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Ltd. is reported to ed to reduce its March employment rkers at its Yoko- hon factory to less f the usual 600 or

ectric Co is said employ only about workers, only about some 3,000 it had pring.

ibaura Electric Co. cancelled a part March new worker ram for its Himeji actory, while Nip- bia Co. had also scheduled new em- or next March.

afirms—

ed from Page 1)

chiefly due to the he three indicators eries—private ma- ders (exclusive of ivate construction inv tory invest- processed turers— ober.

All these indicators were the plus side in Septemb

The coincident series, wh moves in parallel with ness, advanced sharply 42.9 per cent in October 37.3 per cent in Septem chiefly due to the turn of new employment (exclu of new school graduates) dex from a minus to plus

Prices of LSI Circuits Reportedly Reduced to Half by U.S. Makers

American electronics companies are launching a new offensive to sell large-scale integrations to Japanese firms at cheap prices.

According to industry sources such leading LSI manufacturers as National Semiconductor Corp., General Instrument Corp., Fairchild Camera & Instrument Corp. and Signetics Corp. are quoting prices of around $40 for a group of LSIs required for one electronic calculator in negotiations with Japanese calculator companies. (Four or five LSIs are necessary for a calculator.)

The prices are said to be about half of those that prevailed around last spring.

Japanese IC and LSI manufacturers fear that the American firms' move will compel them eventually to cut down on their prices of LSIs in Japan to the level as quoted by the Americans.

They say the situation is much the same as that of early last year, recalling the bitter experience they had in which they were forced inevitably to slash their IC prices due to cheap selling tactics American firms employed in Japan for their ICs made by their Southeast Asian subsidiaries.

Japanese firms however, have few effective countermeasures against the American sales offensive owing to the following problems involved.

First, the Japanese IC and LSI firms, many of which double as manufacturer of computers and communication equipment, themselves also import LSIs and, sometimes, special types of ICs from the American manufacturers.

Second, Japanese LSIs are still inferior to American counterparts in quality. They also lag behind the American products as to mass production volume. Thus, stoppage of cheap U.S. imports by any means may invite opposition from Japanese calculator firms.

The Ministry of International Trade & Industry, which so far has rejected direct foreign investment here in IC making, is taking a wait-and-see attitude. It says domestic production of LSI is still too small for controlling imports.

The industry sources expected the onslaught of cheap American LSIs would continue for some time.

They said that behind the American firms' cheap selling move was a conspicuous oversupply of LSIs on the U.S. market.

Scaling down of the NASA Space budget and cutback of defense outlay have been resulting in a sharp decrease of demand for LSIs and other electronic parts in the U.S., the the sources said.

New Drafting Unit Developed By Mutoh Ind.

Mutoh Industry Ltd., a drafting instrument maker, developed an entirely new utomatic drafting technology featuring direct connection with a miniature electronic computer on an on-line basis with the cooperation of Cut- r-Hammer, Inc. of the U.S.

According to Mutoh, the machine it is to produce with the technology will be exported to the U.S. from early this year through Conrad & Mutoh, Ltd., its American affiliate.

Cutler-Hammer will help in American marketing of the machine as well as offer technological instructions and maintenance services.

Beginning with five units year, Mutoh hopes to attain n annual sales target of between 10 and 20 units before long.

The new technology is said have been developed by mbining the principles of new controller earlier devel- ed by Cutler-Hammer, a mini-computer and Mutoh's n automated drafting ma- ines of other types.

This is an unusual case of port of such machinery by a middle-ranking Japanese ma- r to the U.S. whose auto- atic drafting technology is ated much better developed an that of Japan.

Tariffs—

(Continued from Page 1)

engines will be reduced.

A tariff quota system and differential tariff rates will be applicable generally, if required, to those items on the residual import restriction list which are scheduled to be decontrolled in the future.

The tariff rate on small passenger cars was lowered to 20 from 24 per cent in a revision in the current fiscal year.

This is lower than the 30 per cent rate required in the final year of the Kennedy Round of tariff cuts. The tariff on large passenger cars also was slashed at that time from 28 to 17.5 per cent.

The Ministry of Finance wishes to lower the auto levy still further in line with the Government's price policy and also for adjusting the export environment.

Reduction of the passenger car levy to 10 per cent would bring it to around the 11 per cent decided by EC.

Tie-Up with

Standard VTRs to l

Standard Radio Corp. ha
revealed its plan to start ex
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in a tie-up with Audiotronic
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Although Standard Radi
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Standard Radio Corp. plan
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UESDAY JANUARY 19 1971 THE JAPAN ECONOMIC JOURNAL

Order backlogs of machine tool firms likely to drop

Orders received by the nation's five leading machine tool manufacturers (Toshiba Machine, Okuma Machinery Works, Toyoda Machine Works, Ikegai Iron Works and Hitachi Seiki) are now recording a steady decline.

For example, the orders received by the five firms during the October-November, 1970 period chalked up declines ranging from 10 to 30 per cent from the average [illegible] performances in the semi-annual business term ended September, 1970.

Industry informants are of the belief that this declining tendency will further accelerate in the future and that the new orders received during the current semi-annual accounting period ending March, 1971 will register declines for the first time in five and a half years.

It is especially noteworthy that demands for NC (numerical control) machine tools, by far the most popular of machine tools, are now either marking time or are beginning to decline.

It is highly possible under the circumstances that some companies may have to chalk up sales and profits decreases.

New orders for machine tools began to mark time from about last summer.

The Japan Machine Tool Industry Association states that new orders received by 68 machine tool manufacturers during October, 1970 recorded a sharp drop of 23 per cent from the preceding month and an equally big drop of 20 per cent from the corresponding month a year ago. The association also estimates that the decline would have been sharper in November.

In the case of five leading manufacturers, declines in orders are chiefly ascribed to the following three reasons: 1) demands for universal machines are now on a constant drop, while those for popular NC machine tools also are beginning to taper off, 2) demands for industrial machines also are slipping and 3) no export contracts were sealed at the Canton Trade Fair and exports to Western nations also are marking time.

As the demand drops for NC machines are still comparatively small, Okuma Machinery Works and Ikegai Iron Works, which highlight production of such machines, are faring better than the three other firms.

New orders received during October and November, for example, totaled slightly less than ¥2,700 million (approx. $7.7 million) for Ikegai Iron Works and slightly less than ¥3,000 million (approx. $8.5 million) for Okuma Machinery Works. The figures represent about 10 per cent drops from the averages in the September, 1970 period.

Okuma Machinery Works is now engrossed in making up for the drop in machine tool orders by stepped-up sales of highly popular knitting machines, while Ikegai Iron Works received a boost from the receipt of new orders for rotary printing machines in October.

The two firms, however, are of the belief that the demands for NC machine tools have more or less run their courses and that the situation will become tougher in the future.

Toshiba Machine's new orders in October and November, on the other hand, totaled about ¥4,500 million (approx. $12 million), a sharp drop of about 30 per cent from the average in the semi-annual business period ended September, 1970. This is primarily due to extremely dull orders for such universal machines as boring machines as well as for plastic machines for home electric machinery manufacturers. Complete absence of new orders from China also hurts.

Hitachi Seiki also suffered a 20 per cent new order drop chiefly because of dull demands for milling machines and turret lathes etc.

Toyoda Machine Works suffered a 50 per cent drop in new orders but the drop is primarily due to the fact that its machine tool shipments to Toyota Motor were temporarily put off.

Ford query

Kawasaki Steel Corp. has received an inquiry for 40,[illegible] tons of steel plates for [illegible] from Ford Motor Co of the United States.

Ford had imported sample steel plates from Japanese steel makers including Nippon Steel Corp.

MACHINERY

Fuji HI plans engine sales to America via Teledyne

Fuji Heavy Industries has announced starting export and sales of its general purpose 4-cycle gasoline engine — Robin Engine — in the Western Hemisphere, specially in North America, in a tie-up with Teledyne Wisconsin Motor, a division of Teledyne, Inc. of the United States.

It plans initially to export EY 18 type engines (5 hp) and Robin EY 25 type engines (7 hp) to its U.S. partner. The number of types of the engine to be exported will be increased in the future.

The contract is for five years.

Mitsubishi & Oki due to collaborate

Mitsubishi Electric Corp. and Oki Electric Industry Co. have reached a basic agreement on tying up in the fields of sales, production and technology and shortly are scheduled to work out details.

Capitalized at ¥54,468 million ($151.3 million), Mitsubishi Electric is affiliated financially with the Mitsubishi Bank group of enterprises, while Oki, capitalized at ¥10.5 million ($29.1 million), is linked with the Fuji Bank group.

This mean that the two are due to enter into a tie-up agreement going beyond the bounds of financial groupings.

The salient points of their projected tie-up are as follows:

First, Mitsubishi Electric and Oki, including the latter's two subsidiaries—Oki Univac Kaisha, Ltd. and Nippon Univac Kaisha, Ltd. — will work outdetails for eliminating overlapping in production of main computer systems and terminal equipment.

Second, the two companies will consider combining into systems Mitsubishi Electric's computer control technologies and Oki's communications technologies.

Third, they will try to eliminate duplication of plant-equipment investment and research-development in various fields, such as semiconductors.

Informants said that for the present, the two companies hope carefully to adjust their production regarding the main systems of computers and terminal equipment.

For instance, Oki is expected to be entrusted with the phase of typers (input-output use of keyboards) and Mitsubishi with the display phase. The production roles of the two companies, already are cooperating in making main computer systems, will be additionally clarified.

The two makers also are due draw up a detailed cooperation arrangement in the semiconductor phase in which they now compete as to production and technology and particularly seek an adjustment of their efforts in production of light emitting diodes which both are trying to mass produce.

Indications point that as to machinery and equipment for use of the Defense Agency, Mitsubishi Electric will be entrusted with working out systems making use of Oki's highly advanced super sonic technology for detecting military movements, such as aircraft.

The projected tie-up was expected to increase Mitsubishi Electric's voice as to the operation of the two Oki subsidiaries engaged in production and sales of computers.

Along with this, Mitsubishi Electric was expected to be able to acheive closer relations with the Univac Division of Sperry Rand Corp. through the two Oki subsidiaries that are linked with the U.S. firm.

Informants believed also that Mitsubishi Electric's projected tie-up would enable it at a stroke to cover its present weakness in the field of communications technology as Oki now ranks one of Japan's Big 4 communications equipment maker.

'Copter Prod.

Kawasaki Heavy Industries, Limited of Kobe is going to produce a large helicopter — Kawasaki Vertol KV-107 — entirely with domestic material.

Up to now, the company has been producing the helicopter by importing some parts under a licence from Boeing Co. of the United States.

The new move is intended to cope with the scheduled halt of production of the CH-46, a version similar to the Vertol KV-107, by the Vertol division of Boeing in February.

KHI so far has produced about 60 of the large helicopter since it concluded a contract with Boeing in 1960. Most of them have been offered to the Self-Defense Force. Seven went to the U.S. and Thailand.

FOREIGN

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TECHNOLOGY

Midget tube is developed for cancer

Tokyo Shibaura Elect Co (Toshiba) recently r ported developing a ne technology to produce highly-miniaturized tube electron linear accelerat that is used for radiologic treatment of intern cancer.

Such accelerators are wi ly used for their marked vantage of bombarding the diseased cells becaus secondary X-ray they ei by hurling electron beams gold and other targets much more penetrating.

But the tube had a decis drawback of being so la and bulky that the pati had to take an unnatu body position. Reaching minute trouble spot also technically difficult w such a big tube.

According to the compa its new type of tube will only about a third as la as the conventional tra ling-wave type but just strong in radiological outp

Called a "fixed wave" ty the new tube, resulting fr about three years' study ready has developed 4 million electron volt put level in experimen Varian Associates of U.S. reportedly has devel ed a similar new tube has not yet tried it out

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complete preparations commercial production the engine within next f

Honda also revealed it has developed three t of heat-resisting sintered loy made through mi glass fiber and copper iron in cooperation Sumitomo Electric In tries.

The alloy is to be use material for making en valve sheets which wil free from wear even if time having a lead con 1/20th less than those use at present is

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Mass output of LSIs is planned

Leading Japanese makers of integrated circuits are planning to mass produce LSIs (large-scale integrations) as their chief customers for ICs—manufacturers of desk-top calculators—are beginning to shift their production stress to LSI versions.

Hitachi, Ltd. is hoping, if possible, to expand its production setup from this fall and consolidate a system for producing 300,000-500,000 units monthly.

Mitsubishi Electric Corp. is intending also to ready itself for producing over 200,000 units monthly. The trend to build up LSI lines also pertains to Nippon Electric Co. and Tokyo Shibaura Electric Co. (Toshiba).

As for Hitachi, it recently concluded a LSI production agreement with several calculator makers, such as Sharp Corp. and Casio Computer Co. with the aim of supplying them with LSIs possibly as early as May.

It intends to cut over the greater part of its present MOS-ICs to MOS-LSIs. By such a step, it eyes increasing its LSI output, less than 100,000 units monthly so far, to 300,000-500,000 units.

Mitsubishi Electric also has concluded an agreement on LSI production with close to 10 calculator makers, including Ricoh Co. and Sharp, and plans to begin producing over 200,000 LSIs monthly from June.

Nippon Electric also appears to have entered into a tie-up with Sharp and several other makers, while Toshiba seems due to make a decision on taking up mass production of LSIs this year.

The moves on the part of leading IC makers to enter into mass production of LSIs are ascribed in part to the confidence they now have in their technicians in handling LSI circuits and their development of technology of their own in applying them to computers.

Oil prices—

(Continued from Page 1)

sultant rise of energy costs also will have wide repercussions on domestic industry circles as a whole.

It stands also to hit Japanese public consumers by an advance of commodity prices as a whole.

Japan's petroleum circles are taking an attitude not accepting such a sizable price boost notified by international oil interests.

However, now that major international oil companies and oil-producing countries have finalized their agreement on price raises, indications point that domestic refiners eventually will be obliged to accept the notified raise of prices.

THE JAPAN ECONOMIC JOURNAL

PRE-QUALIFICATI

YEMEN ARAB RE
YEMENESE SALT MINI
SALIF - YEMI

The Yemenese Salt Mining Company of Salif in Yeme of 1971, to invite tenders for the supply and erecti the associated materials handling equipment for th Facilities of the Yemenese Salt Mining Company. Sit about 68 kilometers north of the Port of Hodeidah. qualify General Contractors to whom bidding docume

1. **Scope of Work - CONTRACT No. 1**

   The following sections of this project will be form General Contract No. 1, and shall include th complete erection of:

   a) Berthing facilities for 50,000 ton ships, i groups of steel pipe piles with concret systems, and four floating mooring buoys link anchor chain.
   b) Foundation for ship loading machinery, co ported on steel pipe piles.
   c) Access trestle and wharfhead for vehicles meters of precast concrete decking suppo
   d) Onshore site preparation work including f and machinery foundations.

2. **Scope of Work - CONTRACT No. 2**

   The following sections of this project will be p form General Contract No. 2, and shall include ment, and complete erection of:

   a) Mainline conveyor consisting of 48" wide pulley centres of 518 meters, including all port steel, chutes and a conveyor scale in
   b) Travelling track mounted stacker complet the primary crusher for transfer to stock
   c) A motorized self-contained track mounted receive material from front end loaders shiploaders.
   d) A single quadrant shiploader having 48" w and boom.
   e) Furnish and install all electrical material, for control and lighting of the Stacking, C

3. **Sources of Funds for Financing the Project**

   The enlargement of the facilities is to be finan Economic Development, Kuwait.

4. **Pre-Qualification Questionnaire**

   Interested Contractors may obtain a pre-qualificat addresses:

   Yemenese Salt Mining Company,
   Salif, Yemen Arab Republic

   or

   Cancon Engineering Services Ltd., Consulti
   1525 Robson Street, Vancouver 5, B.C., Ca

   Pre-qualification questionnaire duly completed mus

   Yemenese Salt Mining Company,
   Salif, Yemen Arab Republic

   not later than March 31, 1971.

   A copy of the questionnaire shall simultaneously be Ltd., Vancouver, Canada and to the Kuwait Fund for

   The Contractors selected to receive bidding docum

NIHON KEIZAI (Full)
March 27, 1971

American IC Manufacturers Moving for Investments in Japan

Big American IC (integrated circuit) manufacturers, such as Fairchild and Motorola, have started positive moves to invest capital in Japan. A Government source has revealed that Fairchild and Motorola recently have disclosed unofficially their intention to send their top leaders to Japan early in April, to ask the Japanese Government formally for approval of their plans for investments in Japan. Also, it is considered certain that Texas Instruments (TI) of the US, which is the biggest IC manufacturing firm in the world, will ask for permission to take over all the shares in Japan Texas Instruments (Head Office: Tokyo; President: Masaru IBUKA; capitalized at Y100 million) which it founded jointly with Sony by 50-50 investments, on the occasion of the expiration of its contract with Sony in May. It is considered unavoidable that Japanese electronic industry circles will be shaken seriously by these moves of American IC manufacturers to advance into Japan.

A source in electric machine industry circles said that the top leaders of Fairchild, who are scheduled to come to Japan, are likely to press MITI for approval of their plan to start a joint enterprise in Japan by 50-50 investments by a Japanese firm and the company which Fairchild has already founded on Okinawa solely with its own investments. Also it is expected that Motorola will demand approval of its plan for investments in Japan, on the strength of the precedent established by Japan Texas Instruments.

In Japan, only the import of IC's of less than 100 elements was liberalized in September last year. Capital liberalization has not yet been carried out in the field of the IC manufacturing industry. Consequently, the IC, together with the electronic computer, is regarded as an "eye" of the fourth round of capital liberalization which is scheduled to go into force in August this year.

MITI is planning to include IC's in the negative list on the occasion of the enforcement of the fourth round of capital liberalization, for the reason that the IC is destined to form the foundation for the electronic industry. However, it is worrying over the treatment of the small scale enterprise of Fairchild, which is already turning out IC's on Okinawa, and that of the enterprise which it allowed TI to start in Japan by 50-50 investments in return for the release of basic patents by that American firm, on such conditions as limitation of production for about three years, since the treatment of these enterprises has bearing on Japan-US relations in the future.

Moreover, all other big American IC manufacturers, such as AMI (American Microsystems), NSC (National Semiconductor) and Intel, have revealed their intentions to advance into Japan. MITI's approval of the plans of Fairchild and Motorola for investments in Japan, if given, may exert a great influence on the moves of these American IC manufacturers to start activity in Japan.

It is expected that TI will strongly ask MITI for approval of the expansion of its 50-per cent investments in Japan Texas Instruments up to 100 per cent as from May, and also for repeal of the restrictions which have been imposed on IC production by Japan Texas Instruments. President IBUKA of Japan Texas Instruments revealed the view that "Such problems should be settled by negotiations between TI and MITI." Whether TI can implement its plan, therefore, seems to depend on the results of the negotiations to be held with MITI.

MACHINERY

ırge capital boost · JECC expected in FY 1971

ın Electronic Comput ... a joint leasing enter... of six domestic com... makers, is expected to ... out another share capi... crease during fiscal ... 71, opening April 1, ... rding to informed ... circles. Six Japanese ... electronic makers ... er the company have ... talks among them ... on its proposed capi... al.

most likely rate of in... is an equivalent of ... h of the company's ... of ¥42,325 million ... $118 million. The ... ny thinks that much ... expansion is inevit... ince the availability of short-term commercial bank loans hinges on the scale of its proposed capital increase.

The circles expected the capital increase to be realized in two rounds—during coming July and November—subject to consultations with the Ministry of International Trade & Industry (MITI) backing up the domestic computer industry.

Just how the company will map out its new annual financial operations will have a delicate bearing on the future of Japan's domestic electronic computer industry, the circles said. The industry is facing a steadily pressing need for rebuilding its basic commercial capacity, considering the inevitability of Japan's eventual capital and trade liberalization in the electronic computer field in the nearest future, they added. (MITI is said planning to defer the industry's capital decontrol at least until after coming autumn.)

JECC's computer purchases from its six parent firms for renting to its clientele has been financed by loans from the governmental Japan Development Bank, joint loans by its parent firms and their allies as well as its own rental incomes.

But domestic demands for its computers until recently had been running so high and so fast that it has continued to be heavily in debt to its parents. By the end of fiscal 1970 (the March 31), its payments due shortly to the six makers are reported to run up to an estimated ¥30 billion (approx. $138.3 million).

The company is expected to buy new computers within a tentatively-set framework of ¥130 billion (approx. $361 million) in fiscal 1971. A mere ¥21 billion (approx. $58.3 million) of the fund will be available from JDB. The rest will have to be raised through capital expansion, more joint loans by the sponsors as well as rental earnings.

According to the circles, the company's fiscal 1971 computer purchases are likely to settle down at around ¥95 billion (approx. $263.9 million), about 8.5 per cent less than it has estimated. The obvious slowdown in demands due to Japan's current mini-recession has more or less alleviated its chronic fund shortage difficulties.

But the company still is not sure whether it can have enough liquidity to clear the estimated ¥30 billion purchase bills coming due for settlement by May or June. Its chronic financial inadequacy has aroused a call among its sponsors for its efforts to focus its next annual financial program on reduction of its debts.

·A seeks ·VTR ·nology

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·en Kogyo sales venture

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... es company nam... raulics U.K. Ltd. ... handle mar... e Suzuki? of Yuken ... oducts such as ... pumps, valves and cylinders which the Japanese company produces with its own technologies.

Yuken Kogyo's move is drawing special attention because it is the first such venture by any Japanese hydraulic equipment makers which have been overwhelmingly depending on foreign technologies.

Hydraulics will be capitalized at £20,000, of which Yuken Kogyo will pay 20 per cent and Dowty Hydraulics 80 per cent.

[illegible] Shipbuilding & Engineering Co. ... ed an "[illegible] boat" which will become a ... for an undersea living experiment which ... conducted off [illegible], Kanagawa Pref. Th... to be linked with an elevator leading down ... dwelling and is rigged with equipment ... the experiment.

Color TV set shipment dropped during February

Color television set shipments for domestic market during February dropped sharply by 13 per cent from January to 343,000 units, according to the Electronic Industries Association of Japan.

The decline was larger than last October's drop caused by consumers' nationwide boycott of color television sets over the problems of pricing. The February shipments represented the biggest drop since color television won full-fledged popularity. Also it was the first time that monthly color television set shipments failed to reach 350,000 units since May 1969.

The slowdown was attributed to a seasonal decline in demand and consumers' attitude to wait until makers were through with the rush of announcements of new models and prices.

February exports of color TV sets, on the other hand, increased by 18.3 per cent over the corresponding month of last year to 81,000 units.

The increas... ed by the El... tries Associ... moves in the ... inventories an... makers hastr... ment in antic... March 4 rulin... Tariff Comm... Japanese TV ...

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SET BY MITI

5-year plan for computers

The Ministry of International Trade & Industry has decided a five-year national computerization promotion program to cover Japan's lag behind the U.S. both in computer usage and computer software development.

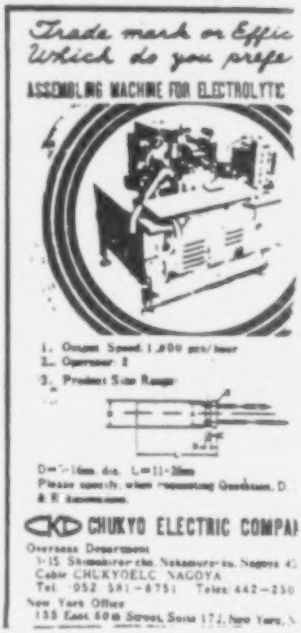
The program has been approved by the Ministry's new Electronic Information Processing Promotion Council.

Setting its targets in fiscal 1975, the program will serve as a guideline for development of information industries in Japan.

According to the program, the total value of computers in operation in this country is to attain ¥3,500 billion (approx. $9.7 billion) by fiscal 1975, 5.7 times as high as the last fiscal 1969 level.

The percentage to the gross national product of that value of computers in usage will thus rise to 3.5 per cent, about the same as the present American rate. (Japan's percentage now stands at only about 1 per cent.)

In development of software, many new programs easily accessible to the public for joint utilization are ... be developed. Emphasis ... be laid on contribu... to Japan's ... -velopment, including environmental pollution control.



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155 East 60th Street, Suite 17J, New York, N...

ASAHI (Full)
April 6, 1971

American IC Manufacturers Express Intentions to Advance into Homeland from Okinawa after Reversion

A Government source clarified on the 5th that Vice President FREEDMAN of Fairchild Corporation, an IC manufacturing company, which ranks second in the US, visited MITI on the same day to explain the Company's capital advance plan toward Japan after the reversion of Okinawa to the homeland.

In the course of the Japan-US negotiations where discussions are also being held as to how to handle the interests of American enterprises already in Okinawa, after the reversion, the handling of Fairchild Corporation has become a focal point. However, according to the Government source, Fairchild Corporation leaders reportedly expressed their intention to "switch over their subsidiary company, which has already been established in Okinawa with 100% Fairchild capital, to a 50-50 joint enterprise with a Japanese enterprise after the reversion of Okinawa."

Also the leaders of Motorola Corporation, another IC manufacturer, which ranks third in the US, are expected to visit Japan shortly to express to MITI their intention to advance into Japan.

Fairchild Corporation obtained approval from the GRI in November of 1969 and started operations in Okinawa for production of IC and other electronic parts. MITI regards the Company's advance into Okinawa as a typical case of last-muinute advance, which aims at advancing into the homeland simultaneously with the reversion of Okinawa, and is clarifying its basic policy that it will be unable to approve the continued existence of the subsidiary company with 100% foreign capital after the reversion as it is.

Japan decided in September of last year to liberalize imports of IC, but it has not liberalized capital transactions. MITI has firmed up its policy to put IC on the negative list as a non-liberalized kind of industry even in the fourth round of capital liberalization, which is expected to be carried out in August of this year.

However, (1) in the case of Fairchild Corporation, it is entangled with the special diplomatic problem of the reversion of Okinawa, and (2) there is the instance that MITI approved, three years ago, in the form of individual screening, the establishment of a joint company "Japan TI", with fifty-fifty capital invested by Texas Instruments, the biggest IC manufacturer in the world, and Sony. For these reasons, MITI firmed up its judgment that it will have to give approval in the form of individual screening, if Fairchild Corporation really reduces its investment rate to 50%. There remain some concrete matters to be settled in the future in connection with Fairchild Corporation's advance into Japan. However, there are prospects for a settlement.

THE JAPAN ECONOMIC JOURNAL
UESDAY APRIL 27 1971

ension mounts from lanned U.S. entry nto IC industry

The situation concerning tal liberalization of in rated circuits has become recently as Fairchild ra & Instrument Corp. Motorola Inc., two makers of ICs in the States have formal revealed to the Government their intention to a capital advance into Japan.

The revelation was made top executives of the firms visited Japan vely and met with ials of the Ministry of national Trade & In

Concerning such moves the two leading IC mak Japanese industry cir have petitioned MITI to approve the plans of child and Motorola to re into Japan.

The value of production ICs in Japan amounted than 1/30th that of U.S. around 1967. The gap was narrowed to 1/10th in 1968, at present, however, production value in Ja is still lower than that the U.S.

The gap in the production volume is a decisive factor in the IC industry where the effects of mass production in bringing down costs are big.

Fairchild and other American makers have been extensively engaged in selling ICs at low prices on the Japanese market ever since the Government liberalized import in September last year of ICs of digital and linear types with less than 100 elements.

As a result, domestic makers in Japan have been forced to cut back on their production by more than 30 per cent.

Disgusted with such a bitter experience, the Japanese firms strongly urged MITI recently to postpone import liberalization of large-scale integration having many elements for at least one or two more years.

Views are strong among the domestic makers that if imports of LSIs are liberalized it will deal them a heavier blow than at the time when imports of ICs were decontrolled.

Amidst such a situation, major makers in the U.S. are attempting to make a capital advance into Japan and produce LSIs even before the liberalization of imports.

Thus, domestic makers have been led to take a cautious stand.

MITI is planning to make a careful study on the bids made by Fairchild and Motorola.

It fears that if the capital advance into Japan of the two firms is approved, other IC makers, including National Semiconductor Corp. (NSC) also will attempt to enter Japan.

In addition, Texas Instruments of the U.S. may demand that its ratio of investments in Texas Instruments Japan Ltd., which the American firm formed with Sony Corp. on an equal investment basis, be raised.

These factors are believed to need full consideration in seeking a solution to the capital advance issue of Fairchild and Motorola.

uccessful ower test

Furukawa Electric Co. has nced success in send electricity through a conductivity power up to a maximum of amperes.

The company said that if high concentration of nt is passed through a -volt transmission that is due to be com cialized shortly, it would possible to achieve a mission capacity as as 10 million kilo

s the first case of a ful test in Japan of per conductivity power

Furukawa up to this time been developing pro for achieving super conductivity and is utilizing this princi

It generally has been re that application of super conductivity is the best and most way for meeting in power transmission ands. Present transmis tems are inadequate handling such a high volume.

The super conductivity transmission formula use of the principle resistance to electricity materials becomes when the temperature is to minus 273 de Centigrade.

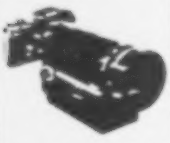
Furukawa's experiment involved producing a by utilizing such ele as niobium and ti tanium.

Bonds—

(Continued from Page 1)

corporate bonds in the form of lowering the interest yields of newly-issued bonds to the level in conformity with the real interest yields of already issued bonds in the market.

Meanwhile, the Federation of Economic Organizations (Keidanren) last week agreed in principle to the proposed gradual elasticity in terms of bond iss-



Nippon Kogaku K.K. develops a new automatic-focusing lens system.

New lens developed

Nippon Kogaku K.K. has succeeded in producing on a commercial basis a lens that focuses itself automatically on an object at the center of the picture area.

This is the first of its kind in the world and will be priced at ¥400,000-500,000 (approx. $1,110-1,380), the company said.

It plans to begin marketing cameras using the new lens within this year.

The lens, called AF-Nikkor 80 mm f/4.5, is equipped with a light-sensitive diode made of cadmium sulfide, which measures the camera-to-object distance and actuates a servo-motor which shifts the position of the lens optics.

The distance-measuring device is sensitive within a circle about 3 mm in diameter in the center of the 24 mm × 36 mm frame, the company said.

In addition to installation in TV cameras, the lens is expected to be put to a variety of use. For example, it will make it possible to take pictures of the interior of a nuclear reactor. Also, an unmanned landing vehicle with a camera equipped with this lens will be able to take very clear pictures of the moon surface.

The range of automatic focusing is over 1 meter to infinity. The lens unit weighs about 2.7 kilograms, including six dry batteries for actuating a servo-motor.

Work robot

A sophisticated industrial work robot to replace human factory workers having a built-in miniaturized electronic computer has been completed in a commercial form by Ishikawajima-Harima Heavy Industries Co.

According to the company, its new Conseiarm CP-II will have a memory capacity more than 10 times as large as any conventional robots of the kind.

Its internal computer fed delicate programming data by magnetic tape and other means will not just make it perform simple repetitive jobs but perform many complex tasks, including [illegible] which requires a memory. Its price will be around ¥14 million (approx. $38,800).

Sales of Air-conditioners to offset TV set

Matsushita Electric Industrial and other home electric machinery manufacturers are now engrossed in pushing sales of home air-conditioners in their attempt to make up for poor sales of color TV sets.

Manufacturers have set the sales target of home air-conditioners for this year at 1,100,000 units, or a sharp increase of 40 per cent over last year's sales performance.

Mitsubishi Electric, for example, has recently "dispatched" about 70 sales engineers of its Shizuoka Works, devoted to production of home air-conditioners, to various retail shops, their sales stores and direct sales affiliates as "sales helpers" in order to give added impetus to this year's home air-conditioner sales.

All other major home electric machinery makers including Matsushita Electric Industrial, Tokyo Shibaura Electric and Hitachi Ltd., also have taken similar measures.

Sharp Corp., on the other hand, sales of AT Affairs and tomer condit sets.

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Mitsu facturing other ¥10,00 those tioner April.

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ASSEMBLING MACHINE FOR ELECTR

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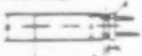
2. Operator 1
3. Product Size Range



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TUESDAY, MAY 4, 1971 THE JAPAN ECONOMIC JOURNAL

MACHINERY

Hitachi and Toshiba purchase LSIs from two U.S. firms

Electric machinery quarters revealed recently that Hitachi Ltd. and Tokyo Shibaura Electric Co. (Toshiba) lately had concluded deals respectively with Mostek Inc. and American Micro-systems Inc. for purchasing large-scale integrations for use of desk-top calculators.

They said, however, that the Ministry of International Trade & Industry was opposed to such imports of LSIs and was now studying ways for restricting them, such as by limiting their quantity or shortening their import time.

This is because though it so far has been allowing virtually all imports, it hopes to clamp strong restrictions on them when the Japanese makers become fully capable of producing their own LSIs.

It reckons that allowing Hitachi and Toshiba, which themselves are producers of integrated circuits, to import LSIs will have an extremely large impact not only at home but abroad.

These quarters said that Hitachi is regarded to have signed a deal to acquire around 250,000 LSIs, equivalent to equipping approximately 30,000 calculators, while Toshiba is believed to have bought about 150,000 LSIs for use of about a similar number of calculators.

They pointed out that the moves on the part of Hitachi and Toshiba to purchase American LSIs serve to point up the weakness of Japan's IC makers inasmuch as both of the two companies continue to hold that a capital advance of large U.S. IC makers would be ruinous for Japan's IC industry.

In what may appear a bit contradictory to their purchases, Hitachi and Toshiba strongly oppose liberalization of import of LSIs. They also favor continuance of production controls of Texas Instruments Japan, Ltd.'s output of ICs.

The fact is, however, that all Japanese makers of desk-top calculators have been trying to switch over their IC models since last year to the LSI type for cutting assembling costs.

Fierce rivalry is under way among some 30 calculator makers. This is regarded to have led Hitachi and Toshiba to buy American LSI as a stopgap until they can produce their own LSIs sufficiently.

Machinery prices rising

Price increases of construction machinery have been conspicuous lately.

Kobe Steel Limited, a major steel and heavy machinery maker, has announced to raise prices of [illegible] all of its construction machinery effective May 1. The price increases average 5 per cent.

Komatsu Limited already raised prices of its construction machinery 4-5 per cent on January 1.

Mitsubishi Heavy Industries Limited also boosted prices for about 35 per cent of its construction machinery by an average of 5 per cent in April.

Kobe Steel's action will affect power shovels, truck cranes and wheel loaders, but the price of hydraulic truck cranes will be unchanged.

Other construction machinery makers, such as Hitachi Construction Machinery Co., Caterpillar Mitsubishi Ltd. and Ishikawajima Koehring Co., are reportedly considering similar price increases.

The makers attribute the boosts to rising labor costs and soaring prices of materials.

Top elec. makers wary over outlay in FY 1971

Four top integrated electric manufacturers have become increasingly cautious over their plant and equipment investments in the current fiscal year.

They are Hitachi, Ltd., Tokyo Shibaura Electric Co., Mitsubishi Electric Corp. and Fuji Electric Co.

This was revealed in final plant and equipment investment schedules in fiscal 1971, announced by the four leaders recently.

In these investment schedules, the four companies are noted to be taking more conservative investment policies than in their interim investment schedules made known some time ago.

The investment outlays by the four companies under the final schedules for fiscal 1971 represent sharp slashes from their actual investments in fiscal 1970.

Among the four companies, Hitachi, Ltd. enforces the most drastic retrenchment of investment outlays in fiscal 1971. In its new investment schedule, the company has decided in principle to forgo all new construction starts of equipment, including expansion projects.

Hitachi has placed the total outlay for plant and equipment investments in fiscal 1971 at around ¥15,000 million (approx. $41.7 million), a sharp cut of 71 per cent from the actual outlay in fiscal 1970.

Tokyo Shibaura Electric Co. has decided to carry out the next severest cut of investments after Hitachi. It has placed the outlay for its equipment investments in fiscal 1971 at ¥25,000 million (approx. $69.4 million), down 38 per cent from fiscal 1970.

Mitsubishi Electric Corp. also has slashed its investment outlay for fiscal 1971 by 14 per cent from that in fiscal 1970 to ¥19,000 million (approx. $52.8 million).

Fuji Electric Co.'s investment outlay also has been retrenched by 4 per cent to ¥6,750 million ($18.75 million).

All these equipment investment schedules of the four companies are on a construction basis.

Except for partial stress placed on investments in the heavy electric machinery divisions in view of the expanding sizes of electric machinery in demand, all the four companies earmark their investment outlays almost exclusively for rationalization and labor saving projects.

Investments in fiscal 1971 are increased over the previous fiscal year only for a few selected divisions, such as the heavy electric machinery and atomic power equipment divisions by Tokyo Shibaura Electric and the measuring instrument and computer peripheral equipment divisions by Fuji Electric.

Retrenchments of investment outlays by the four companies are particularly drastic in the phase of electric appliances.

Acoustic deal

Standard Radio Corp. of Kanagawa Prefecture has received a $2.8-million (FOB) order for eight kinds of sound products, including tuners and amplifiers, from Marantz Co., an audio equipment maker of the U.S.

The Japanese firm is supplying parts and components for the U.S. maker's products.

As a result of the recent deal, Standard Radio is going to turn out most of the key parts and components for Marantz.

Decontrol—

(Continued from Page 1)

tially necessary for Japanese enterprises to propel direct investments overseas, including that in projects for development of overseas resources.

Business leaders, including Ataru Kobayashi, president of the Foreign Investment Council, thus are beginning to feel keener need for drastic decontrol measures under the fourth liberalization schedule and also placing the target at "100 per cent decontrol" in the future round of capital liberalization to follow in its wake.

Fujitsu Ltd., a leading electronics appliance maker, has announced development of a new plasma display panel which enables a man-to-computer communications with charts.

The device consists of two glass sheet panels, having hundreds of lattice-shaped gold electrodes stuck on them, which are put together at a distance of few hundred microns, and neon

Toko develops 2-p wire memory

Toko Inc., an electronic equipment maker, recently developed a wire-memory system of non-destructive type which can be used both as the main internal memory of a computer and a read only memory system.

According to Toko, its RB-150 Wire Memory System, already completed on a commercial basis, has attained a speed of 150 nanoseconds in read-out operations and that of 300 nanoseconds in write-in functions. The new system can do both the read-out and write-in jobs.

This means less than a third of the read-out time and about a half of the write-in time needed by the IC memory system of International Business Machines Corp. of the U.S., so far rated as the speediest of its kind ever commercially produced, Toko said.

Even compared with a new IC memory device, said to be the world's fastest yet, recently developed by Cogar Corp. of the U.S. and is now in a commercialization stage, Toko's memory is just as fast. Moreover, it will be producible at less than half the cost of the forthcoming U.S. product.

Considering the versatility of Toko's new system also to double as two separate systems, observers believed it has opened a way for

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THE JAPAN ECONOMIC
INTERNATIONAL WEEKLY
NIHON KEIZAI SHIMBUN

SDAY, JUNE 15, 1971

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omputer econtrol olicy is larified

mon of electronic ters in the negative the coming fourth of capital decontrol premise that they rthy liberalized when industry structure is ied, has been decided Ministry of International Trade & Industry.

made this clear as al policy last week it called in leaders of Japanese electronic ter makers, including ve Doko, president of Shibaura Electric ha) Co. and concurrently chairman of the Japan Electronics Industry tion Association.

salient points of basic policy are as

computers will be rated in the negative the fourth round.

nd, this, however, will ditioned on the industry revamping and adjustment structure in the future, such as relative to development and sales rdware, software and cooperation.

rd, full-fledged decontrol will be instituted when such a reorganization industry setup is ved.

was the first time that had presented such a cut policy to the in-

I was prompted to com-

(Continued on Page 17)

SATO URGES COMPLIANCE WITH U.S. STANDARDS

Prime Minister Eisaku Sato last week said it strongly behooved Japanese automakers to meet the anti-exhaust gas standards of the U.S. Muskie Act particularly as they place weight on exporting their autos to the U.S.

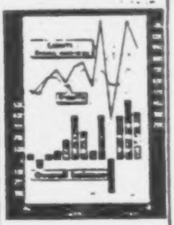
He said that they should strive to develop their technology to meet the requirements of the U.S. law and incorporate such technology that they develop not only in autos for export but those sold in Japan.

The Muskie Act, adopted by Congress at the end of last year, provides for a 90 per cent slash in pollutants given off by auto exhaust gas by 1975 as compared to standards set for last year.

Sato's remark, given at a press conference, backed up the statement made by State Minister Sadanori Ya-

(Continued on Page 5)

GROWING TRADE SURPLUS
(In $ Millions)



The overall balance of payments has been registering a substantial surplus except for January, this year. The January deficit, peculiar to Japan, was mainly due to seasonal factors in the trade account: Japanese traders and makers step up export drives before the new year holiday season starts, with a resultant reactionary decline in January exports. In December, 1970, exports came to $2,168 million and they dropped sharply to $1,258 million in January.

FOR

Bu ey co

Opinion arising quarters out a the Com coping wi ternationa economy.

With Ja to take o character round of in Augu concernin to take-o terprises crease, t Econom (Keidanre lowing st urgent.

First, taken for

EPA estimates yen upvaluation

Japan's current balance will decrease sharply in case of a 10 per cent upward revaluation of the yen.

This was revealed by the Economic Planning Agency in its survey of the estimated effects if a revaluation is enforced.

A revaluation, if carried out, is likely to create various repercussions in many phases of the nation's industrial structure and international competitiveness from a long-range standpoint.

As such long-range effects cannot be accurately and easily calculated, EPA based its survey on short-range and immediate effects, such as the decrease of exports and the increase of imports.

The following were the salient points of the survey, made on the assumption that a 10 per cent upward revaluation of the yen is enforced.

. First, if a 10 per cent revaluation is enforced in the early part of fiscal 1971, the surplus of the current balance in f crease by lion from originally Governme cast.

Second, long-term tions are revaluatio ance (esti a surplus the Gove will regist as a result.

Third, t plus of th will lowe growth ra 15.1 per the Gove by 0.7 through gross dom

Fourth, wholesale cline by a and 1.4 pe ly, as com valuation.

Accordin a 10 per will reduc the trade 1971 by $ from the the Gove forecast lion thro of exports of imports

Howev

(Continu

RYSLER GETS OKAY FOR 35% EQUITY

Foreign Investment l last Friday approved ler Corp. of the United purchasing a 35 per terest in Mitsubishi r Corp.

approval, which came two years since the companies reached ment initially, was the to be given a team of akers launching an ational capital affiliation in Japan.

the same day, Isuzu r Ltd. submitted a of its planned association with General Motors to the Ministry of International Trade & Industry. The company told the it would file a formal application with the nment shortly.

With Toyo Kogyo Co. and Ford Motor Co., another partnership, also intending to seek Government permission for their tie-up, indications are the remaining two of Detroit's Big 3 will also achieve their entry into Japanese market in a month or two.

Chrysler will increase its interest in Mitsubishi by acquiring 15 per cent of the latter's equity stocks in the first year, raising this to 25 per cent in the second year and reaching the approved ceiling of 35 per cent in the third year.

Mitsubishi will issue new shares for this purpose. Chrysler will purchase them by paying premiums. It will invest ¥9,027 million (approx. $26 million) for the first time by the end of next September, ¥8,360 million (approx. $23 million) for the second time by the end of June, next year, and ¥10,883 million (approx. $30 million) for the last time by the end of June, 1973.

The acquisitions thus will aggregate ¥28,750 million (approx. $79 million), which will be 78 per cent more than the face value of new shares to be issued by Mitsubishi, worth ¥16,100 million (approx. $45 million).

Along with the phased investment increase, Chrysler will be represented on Mitsubishi's board by three directors in the first year, five in the second year and seven in the third year and on.

EIGN TRADE

Asahi is wary of yen risk

ahi Chemical In- revealed recently was taking various h as raising the es of its textile pr switching its t export contracts -denominated bas ecting itself again ible upward revalu he yen

hile makers of h d electric appli mobiles and othe y have begun to ard elevating their les, textile industry felt that Asahi C yen risk step ly to cause repercu ng textile makers competition is ely stiff in this tachi Ltd recently ded on a policy of in a negotiable cla ciple in future s for protecting an exchange los t of yen revaluati formants said hi Chemical now g to estimate how pect to lose from uation. They be ever that the loss unt in a consid e as its exports on textiles alone early value of 2 billion (approx mn)

ahi Chemical was e sounding out th ers on raising the rt price of fil ate filament and acryl fabrics by Exports of lately have been ing

to other items it anxious to seek ection clause in fu ines

th regard to plan Asahi Chemical to be finalized of inquiry to be concluded heast Asian natio ntending to sign deals and with Western denominated in e D mark, Swiss Canadian dollar

lso was trying to xport price of its 7 per cent

for Hitachi, it was ng to apply the clause to virtually s of its future was heavy electric electric industrial ery, rolling stock industrial equipment was because Hit that an ear or yen-denomi acts cannot be d to heavy ele ment and other inery in exports

'Outsider' ships are to be used to heck rate hike demand

e freight rate committee the Council of All Japan Exporters Association week said it had agreed representatives of consignors of Hong and the Republic of to foster use of "outsider" ships in opposition to freight rate elevation ned by two freight conferences for liner runs between Japan and the U.S.

Japan/Atlantic & Freight Conference the Trans-Pacific Freight Conference of Japan May notified intention raise their freight rates around 20 per cent from er.

council's announcement followed holding of a ference in Tokyo with representatives of the Hong Kong Shippers' Association and the Korea Traders Association.

The resolution adopted by the three parties said that they were compelled to consider use of "outsider" ships as the conferences' move was completely arbitrary and ignored the rights and interests of the freight consignors.

It was the first case of such a resolution being adopted by an international meeting of freight consignors organizations.

Freight consignors in both Japan and ROK already have received formal notice of the planned freight rate elevation, while those in Hong Kong are expected shortly to receive it. On May 10, JAOFC and TPFCJ notified a raise of 17.5 per cent and about 22 per cent, respectively.

Aside from the point of fostering use of "outsider" ships, the Japanese, ROK and Hong Kong freight consignors agreed to exchange information and co laborate on the rate hi kes.

They also set their sigh on winning the backing related authorities and ec nomic organizations in va ous countries for loweri the announced rate hikes

vi eyes rect sales f jean

Strauss International, representing the largest jeans maker, Levi Strauss, has switched its sales of jeans to via its local general and wholesalers to selling to retail outlets.

San Francisco company for years had been selling its jeans to 30 Japanese apparel dealers through Z. Horikoshi & Co., its Tokyo general agent.

Industry circles believed company had come to feel there was growth potential in growing jeans market to try out the new system of selling its products directly to retail outlets, including department stores, Z. Horikoshi as a local support foothold.

Strauss International sold 120,000 pairs of jeans 270,000 in 1970 and s to sell 500,000 this

Chain stores wish gradual foreign capital decontrol

The Japan Chain Stores Association wishes that the Government will provide for gradual liberalization of the commodity distribution field in the forthcoming fourth stage decontrol of direct foreign capital investment.

This is because it fears that drastic decontrol may seriously affect Japanese retail stores and supermarkets.

The association shortly is due to present such a request to the Government. It hopes that the decontrol will be enforced gradually, such as by setting a limit on the number of chain stores to be liberalized.

While not basically opposed to decontrol, the association believed it was certain that foreign capital would begin actively setting up chains as soon as liberalization was enforced.

As to particularly supermarkets, it felt that the decontrol for them should be delayed to give Japanese supermarkets more time to strengthen their management structure.

With regard to modernization of Japanese retail stores, the association cited that the following steps had to be carried out:

First, relaxation of import controls.

Second, lowering of tariffs.

Third, elastic operation of the law governing wholesale markets.

Fourth, easing controls on the retailing of cereals, liquors and pharmaceuticals.

Fifth, abolishment of the resale price maintenance system under which manufacturers of specified products are allowed to keep pegging the products' prices.

Sixth, elimination of oligopolistic administered prices.

Seventh, abolishment of the Department Store Law.

The association judged that it was only by enforcing such steps that retail stores could compete on equal terms with foreign chains.

As for specific measures to be taken in behalf of retail stores, the association said that the corporate tax should be eased for supermarkets and others that engage in volume sales, the real estate acquisition tax they have to pay for setting up new stores should be lightened, and the Government should provide more loans for setting up commodity centers, shopping centers, automated stores, cold chain systems and other facilities.

omputer decontrol—

ontinued from Page 1)

ncorporating compu- n the negative listing clearly the following

U.S. pressure for Japan to liberalize ters is stiffening and simple inclusion in the ve list is inadequate diplomatic policy

ed, decontrolling com- in present circum- poses danger of being unable to com- with their foreign erparts since the lat- ave had a long history evelopment and are l in scale and Japa- makers are weak in ey still observe the practice of individually developing their products.

MITI authorities hold that their basic policy of lifting controls at a point when the industry has completed reforming itself is an "automobile formula," such as employed in decontrol of automobiles.

Informants thought there was strong possibility now that the same approach would be taken toward decontrol of color films, petrochemicals and distribution—other key phases needing liberalization.

As the computer industry is made up of big makers, the latter generally feel that streamlining the industry through a merger is difficult.

Based on the MITI policy, the computer makers started late last week moves to strengthen and streamline their industrial structure.

The moves are:

1) To accelerate Japan's software development, Toshiba and Oki Electric Industry Co. will join Nippon Software Co., which was established by Fujitsu, Ltd., Hitachi, Ltd. and Nippon Electric Co.

2) The computer makers will exchange one another parts and various kinds of peripheral equipment, if necessary.

3) The six makers will jointly develop a large computer.

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If you have busi the Pacific Basin, Ma atives are ready to he expert advice on loca financing. Facts on lo Introductions to comp joint ventures or lice

Marine Midland kinds of help. Our Far are located in Djakar Sydney and Tokyo.

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ASAHI (Full)
July 13, 1971

Contents of MITI Views on Electronic Computer Industry

The main contents of MITI views on the "Electronic Computer Industry," formulated by MITI on the 12th, are as follows:

Present State of the Electronic Computer Industry and Its Prospects

1. Overwhelmingly Big Sales Amount of American Electronic Computers:

The monetary value of computers installed in our country reached 740 billion yen, by September, 1970. Of this amount, about 50 percent were domestic-manufactured machines. The monetary value of computers installed in the U.S. in January, 1970, amounted to 7,900 billion yen, and the amount was more than ten times the amount in our country. The sales of our country's computer manufacturers amounted to about 153 billion yen (in 1969), as the total of six manufacturers combined. In the same year, the sales amount of IBM was 2,600 billion yen (17 times that of our country). The sales amount of Burroughs was 270 billion yen, and that of CDC was 200 billion yen. Even when the sales amount of our country's six manufacturers are combined, the amount is less than that of CDC, which ranks the lowest in the U.S. The share of U.S. enterprises in the monetary value of computers installed in the world market of the West, is 94.0 percent. The share of European enterprises is 3.8 percent, and the share of Japanese enterprises is 2.2 percent (as of January, 1970).

2. Our Country's Representative Growth Industry:

The Government recently announced a plan for the promotion of the utilization of electronic computers, based on the "Law Concerning the Establishment of the Information Processing Promotion Association, Etc." According to this plan, the monetary value of computer installation at the end of fiscal 1975 will be 3,500 billion yen. In other words, high growth, exceeding more than 30 percent a year, is being envisaged. In the 1970's, renovation of our country's industrial structure is being strongly required. Strong expectations are being attached to the electronic computer industry, hoping that it will fulfill the core role in this.

3. Big Differentials in U.S. and Japanese Competitive Power:

In the sales of computers, domestic manufacturers are compelled to adopt the rental system, in view of the fact that IBM adopts this system. For this purpose, however, tremendous amounts of capital are needed, and the ability to procure rental funds is coming to be a big factor which will determine the competitive power of the enterprises. There is a big differential in the overall performance of computers, including software, and our country is extremely lagging behind especially in the on-line system, which is connected with communication circuits. Also, computers are seeing big-technical renovations every five or six years. All these renovations, furthermore, are led by American enterprises. The IBM 370 Series were announced last year, and electronic computers are entering a new age. There is a very big difference between them and domestic-manufactured machines.

Effects of Liberalization

1. Foreign Machines Will Undoubtedly Sweep Over Japanese Market:

American machines, such as those of IBM, are far superior to domestic-made machines, in their absolute technical standards and in their utilization cost. The techniques of the IBM 370 Series are a threat to domestic electronic computer manufacturers. There is no doubt at all that the Japanese electronic computer market will be completely swallowed up by the liberalization of foreign computers, which have a high technical level.

2. Huge Loss from Dissolving of Rental Contracts:

Different from other commodities, electronic computers are sold under a rental system in which contracts can be dissolved freely. If Japan's present domestic computer market were to be completely replaced by foreign computers, rentals for domestic-made computers, whose estimated value on the books is 350 billion yen, will be dissolved. This amount roughly equals the total sales amount of domestic-made computers in the two years of 1969 and 1970.

3. Domestic Computer Manufacturers Will Be Wiped Out:

To take the examples seen in European nations, which liberalized electronic computers in the 1950's, the market share held by domestic made computers in these nations is 5 percent in the case of France (CII), 20 percent in the case of West Germany (Seimens), and zero in the case of Italy and the three Benelux countries. In the light of the present state in our country, where domestic-made computers account for only about 50 percent of the domestic market, even when they are not yet liberalized, it is clear that domestic electronic computer manufacturers will be unable to survive, if they are liberalized.

4. Big Blow to Our Country's Economy If Knowledge-Concentrated Industries Are Seized by Foreign Capital

The know-how added value is very high in the case of the electronic computer industry. It will be an immeasurable minus for our country's economy as a whole if an important industry, which produces no public nuisances and which should play the core role in Japan's industrial structure in the 1970's, were to be seized by foreign capital.

5. Center of Japan's Nerve System Will Be Controlled by Foreign Capital

Electronic computers have now become the center of the nerve system of Japan's society and economy. For example, traffic control in big cities is now dependent on an automatic control system, which links together computers and traffic signals. If the computers should break down, it will cause a large-scale paralyzing of traffic. If computers were to break down, depositing and drawing out of money from bank accounts, based on the on-line system will become impossible, and if the BADGE System were to fail to function properly, the nation's security will be endangered. If such important functions were to be seized completely by foreign capital, throughout the whole country, not only will our country's economy and society become paralyzed in times of emergency, but it will also place our country in a very disadvantageous position, diplomatically.

6. If Monopolized by Foreign Computers, There Will Be No Way to Resist Price Raises

If Japan's computer market were to become monopolized by a foreign manufacture, for example, by IBM, then there will be no way to resist price raises at any time. It will become extremely easy for IBM to carry out virtual price raises in such forms as unbinding (separating the prices of software) which IBM carried out last year.

Future Countermeasures

1. Large-scale Financial Investments:

Financial investments and loans will be greatly increased, such as increasing the amount of Development Bank loans to the Japan Electronic Computer Company, the increasing of subsidies and investments in the Information Processing Promotion Association, etc., and the promotion of research and development of fourth-generation computers through the large-scale projects system. In order to secure rental funds for computers, loans from the Japan Development Bank to the Japan Electronic Computer Company (JECC), which is the unified rental organ for domestic-manufactured computers, will be increased by a large margin. Development Bank loans to JECC were 9 billion yen in 1969, 24 billion yen in 1970, and 29 billion yen in 1971. (The supplementary disbursements in the preceding year are included in the amount for the current year.)

In order to rectify the lag especially in the software field, the following projects are being carried out, centering on the "Information Processing Promotion Association," based on the "Law Concerning the Information Processing Promotion Association, Etc.," and assistance to these projects will be further increased.

(1)Investments in the Credit Guarantee Funds of the Credit Guaranteeing Business Association to extend loans for software development funds to software enterprisers, were 200 million yen each for the Government and private circles, in 1970. The investment amount has been increased to 400 million yen each, in 1971.

(2)Subsidies for the development of advanced software on commission and for the Association's development of software on commission were 300 million yen in 1970. The amount was increased to 400 million yen in 1971.

(3)Software enterprisers' software development funds are being loaned by the three long-term credit banks, with the Fund Operation Section accepting the loan debentures, as a "financing measure for the promotion of information processing." The amount of funds for financing measurers for the promotion of information processing was 4 billion yen in 1970. The amount was increased to 9.5 billion yen in 1971.

The improvement and development of fourth-generation computers under the big projects system will be greatly enlarged. Electronic computers have been developing from the first-generation computers using vacuum tubes, the second-generation computers using transistors, and the third-generation computers using the integrated circuit system. With the development of the IBM 370 Series not long ago, it is said that computers have now entered the 3.5 generation system. However, following this, it is thought that as the fourth-generation computers, those which can handle and dispose of solid forms, Chinese characters and sounds and voice (pattern "information"), besides figures and alphabets, as at present, will be developed. Therefore, research and development of "pattern information processing systems" will be promoted. Research and development has started from this year, under an eight-year plan, as one of the big projects of the Industrial Techniques Agency, with a total budget of 35 billion yen.

2. Adjustment of Measures Toward Other Countries:

Both capital and imports are restricted, at the present time, for the electronic computer industry. In the future, the import restriction system, the restrictions on the induction of foreign capital and the lowering of tariffs will be handled with great care, carefully ascertaining the actual state of the competitive power of the manufacturers concerned, future strengthening of competitive power, and the effects of measures to be carried out to aid these moves.

TOKYO SHIMBUN (Full)
July 22, 1971

MITI to Exclude Electronic Computers Totally from Capital Liberalization

Partial Liberalization to Take Place for Import of Peripheral Instruments

MITI on the 21st held a conference of its high-ranking officials on the treatment of electronic computers which has been a key problem for the fourth round of capital liberalization. The conference agreed upon the following: (1) to include all of the main body of the computer, peripheral instruments, parts and the information processing industry (soft-ware) in the negative list (list of non-liberalization items), as far as capital liberalization is concerned; (2) to regroup, however, the related industries, which have been classified into three categories, into two--the "main body of the computer and related industries" and the "information processing industry"; (3) to carry out import liberalization for a part of the peripheral instruments.

MITI will report its decision at the meeting of the Investigation Sub-Committee (Chairman: Masahiro TSUKUDA) of the Foreign Capital Deliberation Council which will be held on the 22nd. At the same time, it will start negotiations with the six firms manufacturing electronic computers. In political and business circles, however, there is the opinion that the steps decided upon by MITI are "not sufficient for substantial liberalization." It is expected, therefore, that there will be many turns and twists before a final decision will be made on the extent of liberalization. There is the possibility of a liberalization plan slightly more advanced than MITI's plan being adopted in the end.

MITI has decided upon the aforementioned measures because it thought it would be impossible to establish more drastic liberalization measures under the present circumstances, in view of the still strong opposition against liberalization among the manufacturers of electronic computers.

MITI has also decided, however, to reduce the three categories covering electronic computer production and related industries to two because the Government has already decided to make the fourth round of capital liberalization a "final round" and include not more than eight industries in the negative list. There is the opinion that the Government should not clarify the date for exclusion of electronic computers from the negative list. The view is growing, however, that it is proper to keep electronic computers on the negative list for about three years, on such conditions as reorganization of the manufacturing enterprises with heavy assistance of the Government.

Import liberalization has been most strongly demanded by the U.S. MITI holds, however, that it is difficult for Japan to carry out import liberalization covering the main body of the computer, parts and integrated circuits (IC), in view of a serious gap in strength between Japanese and American manufacturers of these items. It is only studying, therefore, the extent to which the import of peripheral instruments can be liberalized.

As a result of the decision made by MITI, prospects are growing for conditional exclusion of electronic computers from capital liberalization and import liberalization covering some computer parts. In any case, it is inevitable that the U.S. will continue demanding computer liberalization by Japan. MITI, therefore, wants to take such steps as (1) to strengthen Japan Electronic Computer Company (JECC) drastically, and (2) to offer assistance to the development of new-type computers on a priority basis.

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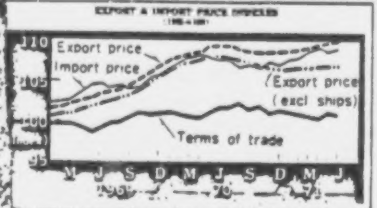

The export price index in June recorded the seventh consecutive increase to reach 109.9 (1965=100). This was up 0.2 per cent from the preceding month, and up 0.6 per cent from the corresponding month a year ago. Meanwhile, the import price index also increased to stand at 110.0, up 0.5 per cent from the previous month. As a result, the terms of trade worsened by 0.3 point to 100.8.

'nt'l agencies envisage succession of yen bonds

en-denominated bonds international agencies be floated in the Japa- capital market in d succession in and r this fall.

Included among international agencies reportedly ning to issue yen-denominated bonds in Tokyo the International Bank for Reconstruction and lopment (World Bank), Inter-American Development Bank and the Asian lopment Bank.

ernational agencies have begun to show ting interest in bond tion in Japan in view of policy of the Ministry of ice and the Bank of to propel capital ex- for the dual purpose of ing Japan's exchange es and coping with ive domestic liquidity. same time, issuances ds in the Tokyo capi- rket have become in- ngly attractive for due to the gradual decline of long-term interest rates here to the international level.

The wide-range easing of money in Japan thus is serving to accelerate the pace of internationalization of

(Continued on Page 8)

GOV'T FINALIZES POLICY

Decontrol of computers will be 3 yrs hence

The Government last week made a final decision to liberalize manufacture, sales and rental of main computer systems and their related devices three years hence.

However, it decided to incorporate integrated circuits partially in the forthcoming fourth round of liberalization of direct foreign investments in Japan scheduled in August.

The decision put a period to the protracted controversy pertaining to capital and import decontrol of computers as the computer industry agreed to accept the decision in principle.

The salient points of the Government's final plan were as follows:

First, as to capital decontrol, of the three phases of the computer industry, partial decontrol will be carried out of ICs for appliance use which come under the phase of the "industry engaged in manufacture of products for high efficiency semiconductors" in the fourth round of liberalization. Decontrol of manufacture, sales and rental of the main computer systems and their related devices will be enforced three years after the fourth round is carried out.

Second, import decontrol of peripheral devices will be recognized for them, excluding memory and terminal devices, up to 80 per cent of the value of computer related imports within this year or by the end of this fiscal year (April, 1972).

Third, the Government will establish a special account for financing countermeasures relative to computer decontrol and earmark a sum of ¥51 billion (approx. $141.6 million) yearly over a three-year period, starting from the next fiscal year, as a subsidy for promoting as well as reorganizing the industry's structure.

With regard to capital de-

(Continued on Page 8)

Overseas investm't trust purchasing

The Ministry of Finance has decided to decontrol Japanese investment in overseas securities investment trusts within the period of the next one year as its second step for liberalization of Japanese investment in foreign securities.

MOF's decision has been influenced also by indications that the board of directors of the Organization for Economic Cooperation and Development shortly will submit a recommendation to various countries, including Japan, asking them to observe the "minimum standard rule" on international securities investment trust recently finalized by OECD.

The Ministry was intending in this regard to present a bill for legally controlling transactions in overseas securities investment trusts to the next Ordinary Diet session for forestalling troubles that might arise from such decontrol of Japanese investment.

Its latest decision to decontrol Japanese investment in overseas securities investment trusts follows up the move it took from last July to liberalize investments by Japanese individuals and enterprises in overseas securities.

Informants believed that other countries, simultaneously with Japan, would move to adopt OECD's latest minimum rule so as to further internationalize securities investment trust operations.

As for OECD's latest rule, they said that the Committee for Invisible Transactions of OECD worked out a 35-point international rule at the beginning of this month as part of its work to adjust OECD's liberaliza-

(Continued on Page 9)

USINESSES HALTED

aw its invitations to businesses since it to have the forth- meeting confine its ions solely to political s.

committee originally heduled to exchange with all participants road range of topics, he political, economic ltural matters rela- the Japanese-Taiwan s, to prepare for its meeting next fall.

ver, in light of the international devel- that seriously have to affect relations Japan and Taiwan, lers of the commit- parently judged that frank opinions could not be expected from businessmen at the meeting.

They thus decided to exclude economic matters from the subjects of talks and to limit them only to political aspects. They also felt that more frank opinions could be heard at such a meeting of limited number of people.

Prior to the latest decision of the committee, Nippon Steel Corporation and some other big businesses revealed their decision not to participate in the meeting, reportedly from the fear of worsening of their relations with China.

COSMOTRON
electronic
CITIZEN
Tokyo, Japan

ɜral Motors entry is likely ɩuse big change in industry

Motors Corporation ... lased itself in the ... f making a direct ... ivestment into ... automobile indus... h its recent sign... tracts with Isuzu ... nited.

... of such a enter... ng no less than ... on (approx. $24.1 ... year and employ... y as 800,000 per... oubtless, work as ... le brake to show ... en halt the long-... oligopolic control ... rm Japanese au... dustry and mar... ta Motor Co. and ... or Co.

... pected to rede... u into its Far ... othold for pro... small passenger ... rucks and utilize ... its planned ex... ontinental China ... to the U.S. and

... ustry's already ... competition ... is grow fiercer ... p of this, there ... indications that ... ng on the Japa... will be the start... or a new kind of ... organization of the whole industry since one of the two other American automobile giants is already in Japan to start such a tie-up and the other will follow soon.

Chrysler Corp. and Mitsubishi Motors Corp. have recently obtained the Government's permission for such alliance, while Ford Motor Co. and Toyo Kogyo Co. are expected to be a third team of the kind before long. That will mean a redivision of the industry into six camps—Toyota, Nissan and Honda Motor Co., a motorcycle and car maker going its own way, and the three Japanese-American alliances.

Along with this, Japanese auto industry will be reorganized into six camps, such as independent makers as and three makers each tying up with the Big Three of the U.S.

Toyota and Nissan, put together, now command an estimated 80 per cent of the domestic passenger car market. Isuzu holds no more than 1 per cent or so.

Isuzu and GM, however, intend to increase Isuzu's share to 6 or 7 per cent as their initial target in rebuilding Isuzu's business, and possibly much higher later.

Some quarters even see the possibility that they will use GM's influence to lure many domestic dealers out of the Toyota and Nissan camps to their side.

GM is thus expected to make no small amount of investments in rebuilding Isuzu's domestic business in addition to its original capital investment in it.

Another advantage for the Isuzu-GM team is the fact that GM has been developing pollution-free automobiles. If such vehicles developed by GM's technology come to be assembled and marketed by Isuzu, it would pose a serious menace to Toyota, Nissan and all others.

Auto ... gains

... out in June in... 1.5 per cent from ... month to 496,-... ng to the Japan ... Manufacturers

... reported that ... duction during ... months of this ... d a gain of 9.6 ... ver the corres-... iod of last year ... 2,821,047. This ... vorable gain was ... p rising export ... hich more than ... g domestic de-... h stood below ... corresponding

... roduction, on ... mestic business ... had a full im-... d by 1.5 per ... the six-month ... the correspond-... last year.

... three of the ... truck manufac-... ubishi Motors, ... otors, Ltd. and ... Ltd. — have ... back produc-

...DUCTION IN ...YEAR, 1971

	% chg. from Jan.-June, 1970	Mkt. (%) share
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[illegible]

Toyo sells

Toyo Engineering Corp. has signed a formal contract for export of a huge vinyl chloride plant to Romchim, the import corporation of the Rumanian Ministry of Petrochemical Industry.

It will build at Ramnicu-Valcea, northwest of Bucharest, the plant that will produce yearly 100,000 tons of vinyl chloride monomer.

The plant and related equipment, worth about $7.9 million including supervising fee for trial operation, is 2.5 times as big as Japan's largest plant of the kind.

The Rumanian Government will make a down payment of 20 per cent of the total cost, and the rest will be paid on a deferred payment basis for eight years at an annual interest of 6.5 per cent.

Decontrol of—

(Continued from Page 1)

control, the Government's plan is aimed at limiting this at present to the components field.

This means that large scale integrations and ICs for use of desktop calculators and other products will be decontrolled.

Software development and data processing—the two other fields of the computer industry—will become objects for individual screening under the fourth round of capital decontrol.

Components coming under the phase of the "industry engaged in manufacture of high-efficiency semiconductors" which were not decontrolled this time will be liberalized three years after the fourth round is carried out.

Items, excluding memory and terminal devices, whose imports will be decontrolled are the following:

Card readers, card perforators, paper tape readers, paper tape perforators, optical readers, optical mark readers, magnetic ink readers, word display devices, chart display devices, verbal response devices, "kanji" type printers, line printers having a capacity to print less than 1,500 lines per minute, similarly those of a punch type, magnetic tape recorders, magnetic tape printers.

While the computer industry agreed in principle to the Government's final plan, it took a serious view of the issue from belief that there was no doubt that the plan would have considerable adverse repercussions on it.

It thus has decided strongly to urge the Ministry of International Trade & Industry to carry out effective measures for fostering the industry and to work out measures for reorganizing the industry in close collaboration with the Ministry.

For the present, the industry wishes to build up its international strength for competing with International Business Machines Corp. of the U.S.

As to permitting capital decontrol in the IC phase, big Japanese makers of ICs, such as Hitachi, Ltd. and Nippon Electric Co., were fearful that the step might lead U.S. makers, such as Fairchild and Motorola, quickly to take advantage of it.

Informants thus said these makers henceforth were expected to redouble their efforts to strengthen their designing capacity and increase their production yield in this area.

from our Sydney Bureau

Matsushita, NEC and NSK are doing well in Australia

Three Japanese companies which have entered into local manufacturing in Australia are doing relatively well.

They are having no major trouble in getting labor, unlike that in Japan.

This was reported by Ichiji Ishizaki, Nihon Keizai Shimbun correspondent in Sydney. His account is as follows:

Japanese enterprises engaged in local manufacture in Australia lately have increased to three with the start of operation of a plant of Nippon Electric Co. The others are Matsushita Electric Industrial Co. and Nippon Seiko K.K.

Those in charge of their factories say their difficulties now concern management of labor, delays in receiving parts owing to the waterfront strike and the fact they cannot anticipate achieving a profit quickly as the market is small.

✓ However, they say that the advantages are that property can be acquired cheaply and wages are not as high as believed in Japan.

Matsushita, the first to advance into Australia, is now in the third year of its operation. The plant of its wholly-owned subsidiary Matsushita Electric Co. (Australia) Pty., capitalized at A$800,000, is situated at Penrith, a town of about 60,000, some 70 kilometers West of Sydney. The plant's tract, covering an area of about 32,000 square meters, was bought at a price of only A$7.50 (about ¥3,000) per 3.3-square meter unit (the standard land measurement unit in Japan).

This plant assembles and sells 1,500 sets of four varieties of monochrome TV receivers ranging from those of 12- to 25-inch screen size, monthly and 100 stereophonic phonographs.

One of the reasons for selecting Penrith was the relative cheapness of woman labor. At present, the plant employs 85 persons, including those engaged surveillance and cler work. Of them, about 80 cent are local women.

The situation is about same for Nippon Seiko K

NSK Manufacturing (Australia) Pty. was establis at the end of 1969. Eig per cent of its capitalizat of A$400,000 was footed Nippon Seiko and the mainder by Nichimen Co

The subsidiary purcha a tract of about 40, square meters at Jeelo 80 kilometers Southwest Melbourne, at a price ¥470 per 3.3 square met and completed a plant th at the end of last year.

NSK produces small be ing having an inner diam ter of less than 10 mm.

It already manufactu close to 200,000 beari a month and virtually me all domestic demand such small types.

It employs 30 perso With the exception of t plant foreman and t other Japanese, all a Australians.

Nippon Electric has up NEC Australia Pty., cap talized at A$500,000. plant located at Mulgra about 20 kilometers aw from Melbourne, began o eration from June.

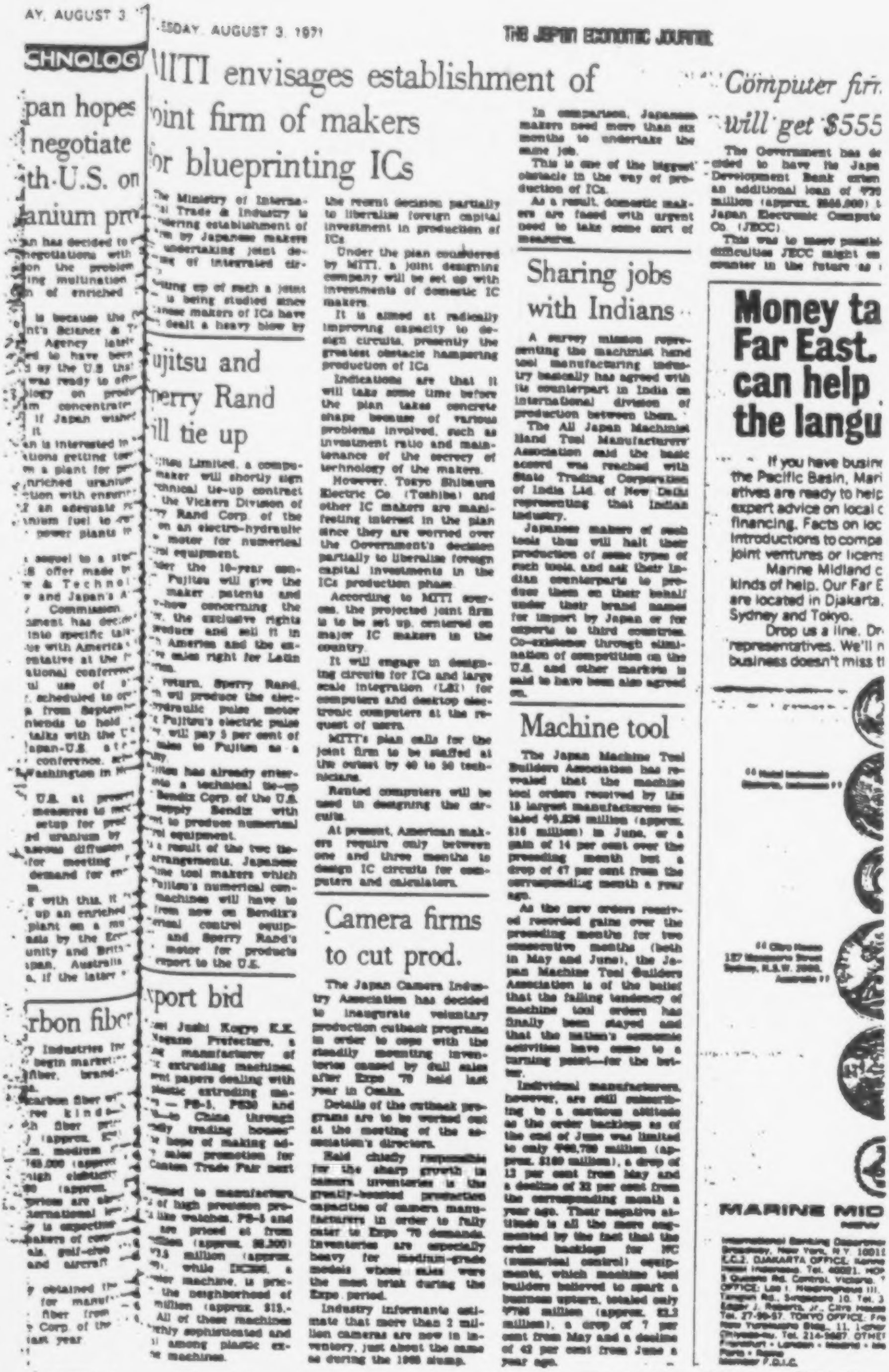
At the present time, it h a backlog of orders amoun ing to A$8 million and judg its production to be wor about A$80,000 monthly.

Foreign-affiliated ente prises in Australia no have to observe a financ guideline set by the Au tralian Government.

Their borrowing from d mestic banks come und regulation and a 100-p cent self-financed ente prise, for instance, as principle, is allowed to bo row up to only 10 per ce of its capitalization.

Nippon Seiko's borrowi limit has been widened, how ever, as it has exported products to Europe, made a advance into the seconda manufacturing field and handling products which a not made in Australia.

INRA
RESEARCH
7-12, Roku-bancho, Chiyoda-ku, Tokyo
Tel: 261-0088



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SDAY, AUGUST 3, 1971

THE JAPAN ECONOMIC JOURNAL

CHNOLOGY

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g with this, it up an enriched plant on a mu asis by the Eu unity and Brit apan, Australia a, if the latter

IITI envisages establishment of oint firm of makers or blueprinting ICs

he Ministry of Interna- al Trade & Industry is dering establishment of m by Japanese makers undertaking joint de- ing of integrated cir-

tting up of such a joint is being studied since anese makers of ICs have dealt a heavy blow by the recent decision partially to liberalize foreign capital investment in production of ICs.

Under the plan considered by MITI, a joint designing company will be set up with investments of domestic IC makers.

It is aimed at radically improving capacity to design circuits, presently the greatest obstacle hampering production of ICs.

Indications are that it will take some time before the plan takes concrete shape because of various problems involved, such as investment ratio and maintenance of the secrecy of technology of the makers.

However, Tokyo Shibaura Electric Co. (Toshiba) and other IC makers are manifesting interest in the plan since they are worried over the Government's decision partially to liberalize foreign capital investments in the ICs production phase.

According to MITI sources, the projected joint firm is to be set up, centered on major IC makers in the country.

It will engage in designing circuits for ICs and large scale integration (LSI) for computers and desktop electronic computers at the request of users.

MITI's plan calls for the joint firm to be staffed at the outset by 40 to 50 technicians.

Rented computers will be used in designing the circuits.

At present, American makers require only between one and three months to design IC circuits for computers and calculators.

In comparison, Japanese makers need more than six months to undertake the same job.

This is one of the biggest obstacle in the way of production of ICs.

As a result, domestic makers are faced with urgent need to take some sort of measures.

ujitsu and perry Rand ill tie up

ujitsu Limited, a compu- maker will shortly sign chnical tie-up contract the Vickers Division of y Rand Corp. of the on an electro-hydraulic motor for numerical rol equipment.

der the 10-year con- Fujitsu will give the maker patents and -how concerning the r, the exclusive rights roduce and sell it in America and the ex- e sales right for Latin rica.

return, Sperry Rand, h will produce the elec- ydraulic pulse motor Fujitsu's electric pulse will pay 5 per cent of sales to Fujitsu as a lty.

ujitsu has already enter- to a technical tie-up Bendix Corp. of the U.S. supply Bendix with t to produce numerical rol equipment.

s a result of the two tie- arrangements, Japanese ne tool makers which ujitsu's numerical con- machines will have to from now on Bendix's erical control equip- and Sperry Rand's motor for products xport to the U.S.

Camera firms to cut prod.

The Japan Camera Industry Association has decided to inaugurate voluntary production cutback programs in order to cope with the steadily mounting inventories caused by dull sales after Expo '70 held last year in Osaka.

Details of the cutback programs are to be worked out at the meeting of the association's directors.

Said chiefly responsible for the sharp growth in camera inventories is the greatly-boosted production capacities of camera manufacturers in order to fully cater to Expo '70 demands. Inventories are especially heavy for medium-grade models whose sales were the most brisk during the Expo period.

Industry informants estimate that more than 2 million cameras are now in inventory, just about the same as during the 1965 slump.

Sharing jobs with Indians

A survey mission representing the machinist hand tool manufacturing industry basically has agreed with its counterpart in India on international division of production between them.

The All Japan Machinist Hand Tool Manufacturers' Association said the basic accord was reached with State Trading Corporation of India Ltd. of New Delhi representing that Indian industry.

Japanese makers of such tools thus will halt their production of some types of such tools, and ask their Indian counterparts to produce them on their behalf under their brand names for import by Japan or for exports to third countries. Co-existence through elimination of competition on the U.S. and other markets is said to have been also agreed on.

Machine tool

The Japan Machine Tool Builders Association has revealed that the machine tool orders received by the 15 largest manufacturers totaled ¥5,826 million (approx. $16 million) in June, or a gain of 14 per cent over the preceding month but a drop of 47 per cent from the corresponding month a year ago.

As the new orders received recorded gains over the preceding months for two consecutive months (both in May and June), the Japan Machine Tool Builders Association is of the belief that the falling tendency of machine tool orders has finally been stayed and that the nation's economic activities have come to a turning point—for the better.

Individual manufacturers, however, are still subscribing to a cautious attitude as the order backlogs as of the end of June was limited to only ¥63,750 million (approx. $180 million), a drop of 13 per cent from May and a decline of 32 per cent from the corresponding month a year ago. Their negative attitude is all the more augmented by the fact that the order backlogs for NC (numerical control) equipments, which machine tool builders believed to spark a business upturn, totaled only ¥766 million (approx. $2.1 million), a drop of 7 per cent from May and a decline of 42 per cent from June a year ago.

Computer firi will get $555

The Government has de cided to have the Japa Development Bank exten an additional loan of ¥20 million (approx. $555,000) t Japan Electronic Compute Co. (JECC).

This was to meet possibl difficulties JECC might en counter in the future as

rbon fiber

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xport bid

ai Jushi Kogyo K.K. Nagano Prefecture, a ng manufacturer of c extruding machines, ent papers dealing with plastic extruding ma- — PB-1, PB30 and to China through ndly trading houses" e hope of making ad- sales promotion for Canton Trade Fair next

ned to manufacture s of high precision pro- s like watches. PB-1 and are priced at from million (approx. $8,300) 3.5 million (approx.), while [illegible], a ller machine, is pric- the neighborhood of million (approx. $13,- All of these machines ghly sophisticated and among plastic ex- e machines.

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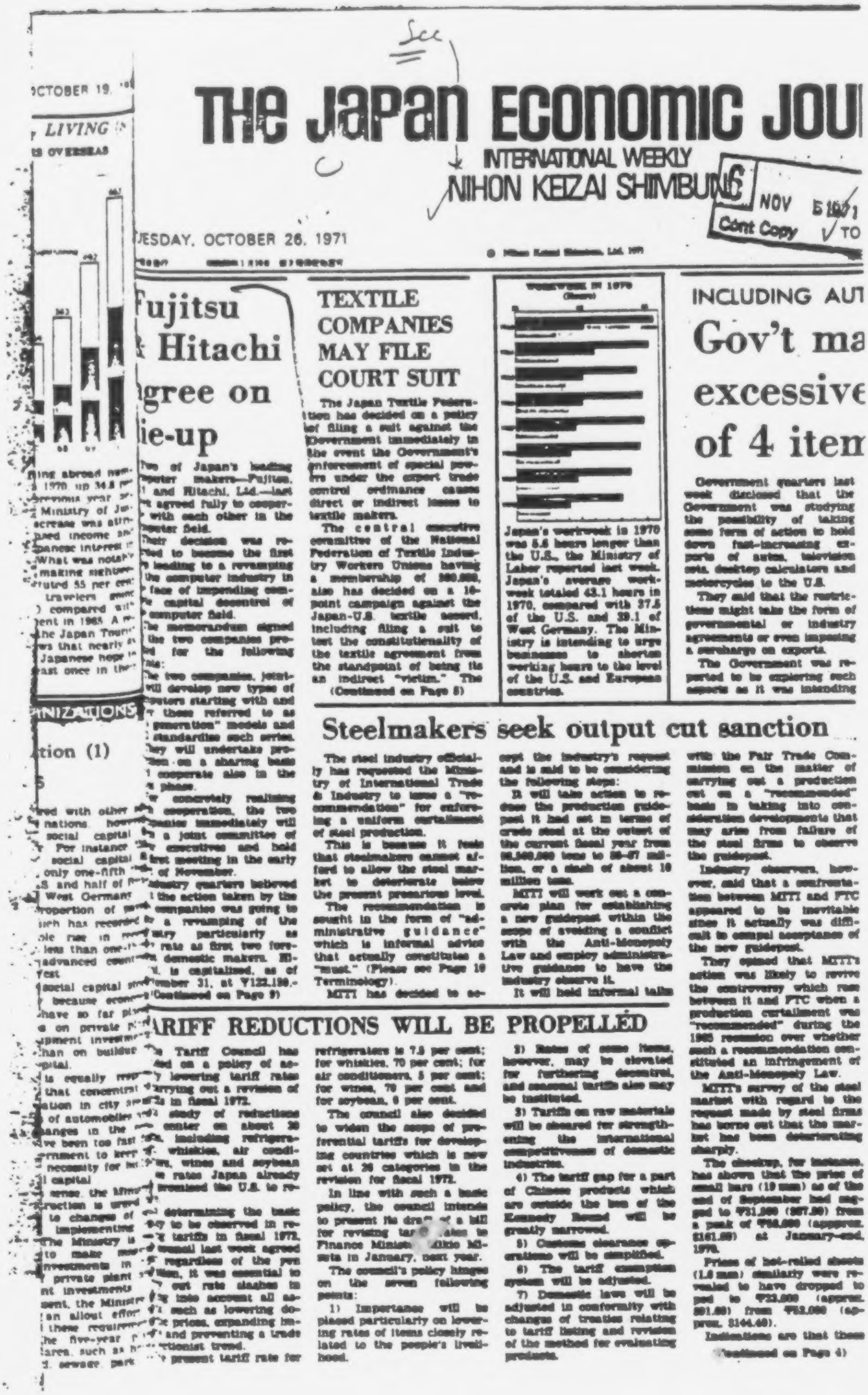

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ESDAY, OCTOBER 26, 1971

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CTOBER 19, 19

LIVING
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Fujitsu & Hitachi agree on tie-up

Two of Japan's leading computer makers—Fujitsu, Ltd. and Hitachi, Ltd.—last week agreed fully to cooperate with each other in the computer field.

Their decision was regarded to become the first step leading to a revamping of the computer industry in the face of impending complete capital decontrol of the computer field.

The memorandum signed by the two companies provided for the following items:

The two companies, jointly will develop new types of computers starting with and ... those referred to as "... generation" models and standardize each series. They will undertake production on a sharing basis and cooperate also in the ... phase.

For concretely realizing the cooperation, the two companies immediately will form a joint committee of top executives and hold the first meeting in the early part of November.

Industry quarters believed that the action taken by the two companies was going to lead to a revamping of the industry particularly as ... rate as first two foremost domestic makers. Hitachi ... is capitalized, as of ...ember 31, at ¥122,190,-

(Continued on Page 9)

TEXTILE COMPANIES MAY FILE COURT SUIT

The Japan Textile Federation has decided on a policy of filing a suit against the Government immediately in the event the Government's enforcement of special powers under the export trade control ordinance causes direct or indirect losses to textile makers.

The central executive committee of the National Federation of Textile Industry Workers Unions having a membership of 380,000, also has decided on a 10-point campaign against the Japan-U.S. textile accord, including filing a suit to test the constitutionality of the textile agreement from the standpoint of being its an indirect "victim." The

(Continued on Page 8)

WORKWEEK IN 1970 (Hours)

Japan's workweek in 1970 was 5.6 hours longer than the U.S., the Ministry of Labor reported last week. Japan's average workweek totaled 43.1 hours in 1970, compared with 37.5 of the U.S. and 39.1 of West Germany. The Ministry is intending to urge businesses to shorten working hours to the level of the U.S. and European countries.

INCLUDING AU

Gov't ma excessive of 4 item

Government quarters last week disclosed that the Government was studying the possibility of taking some form of action to hold down fast-increasing exports of autos, television sets, desktop calculators and motorcycles to the U.S.

They said that the restrictions might take the form of governmental or industry agreements or even imposing a surcharge on exports.

The Government was reported to be exploring such exports as it was intending

Steelmakers seek output cut sanction

The steel industry officially has requested the Ministry of International Trade & Industry to issue a "recommendation" for enforcing a uniform curtailment of steel production.

This is because it feels that steelmakers cannot afford to allow the steel market to deteriorate below the present precarious level.

The recommendation is sought in the form of "administrative guidance" which is informal advice that actually constitutes a "must." (Please see Page 10 Terminology).

MITI has decided to accept the industry's request and is said to be considering the following steps:

It will take action to reduce the production guidepost it had set in terms of crude steel at the outset of the current fiscal year from 98,300,000 tons to 86-87 million, or a slash of about 10 million tons.

MITI will work out a concrete plan for establishing a new guidepost within the scope of avoiding a conflict with the Anti-Monopoly Law and employ administrative guidance to have the industry observe it.

It will hold informal talks with the Fair Trade Commission on the matter of carrying out a production cut on a "recommended" basis in taking into consideration developments that may arise from failure of the steel firms to observe the guidepost.

Industry observers, however, said that a confrontation between MITI and FTC appeared to be inevitable since it actually was difficult to compel acceptance of the new guidepost.

They opined that MITI's action was likely to revive the controversy which rose between it and FTC when a production curtailment was "recommended" during the 1965 recession over whether such a recommendation constituted an infringement of the Anti-Monopoly Law.

MITI's survey of the steel market with regard to the request made by steel firms has borne out that the market has been deteriorating sharply.

The checkup, for instance, has shown that the price of small bars (19 mm) as of the end of September had sagged to ¥31,000 ($87.90) from a peak of ¥58,000 (approx. $161.00) at January-end, 1970.

Prices of hot-rolled sheets (1.6 mm) similarly were revealed to have dropped to ... to ¥33,000 (approx. $91.00) from ¥52,000 (approx. $144.40).

Indications are that these

(Continued on Page 4)

ARIFF REDUCTIONS WILL BE PROPELLED

...e Tariff Council has ...ded on a policy of ac...y lowering tariff rates ...arrying out a revision of ...s in fiscal 1972.

...study of reductions ...center on about 30 ...s, including refrigera...., whiskies, air condi...ers, wines and soybean ...e rates Japan already ...promised the U.S. to re-

...determining the basic ...cy to be observed in re...g tariffs in fiscal 1972, ...council last week agreed ... regardless of the pre...tion, it was essential to ... cut rate slashes in ... into account all as...s such as lowering do...c prices, expanding im... and preventing a trade ...ctionist trend.

...present tariff rate for refrigerators is 7.5 per cent; for whiskies, 70 per cent; for air conditioners, 5 per cent; for wines, 70 per cent and for soybean, 6 per cent.

The council also decided to widen the scope of preferential tariffs for developing countries which is now set at 26 categories in the revision for fiscal 1972.

In line with such a basic policy, the council intends to present its draft of a bill for revising tariff rates to Finance Minister Mikio Mizuta in January, next year.

The council's policy hinges on the seven following points:

1) Importance will be placed particularly on lowering rates of items closely related to the people's livelihood.

2) Rates of some items, however, may be elevated for furthering decontrol, and seasonal tariffs also may be instituted.

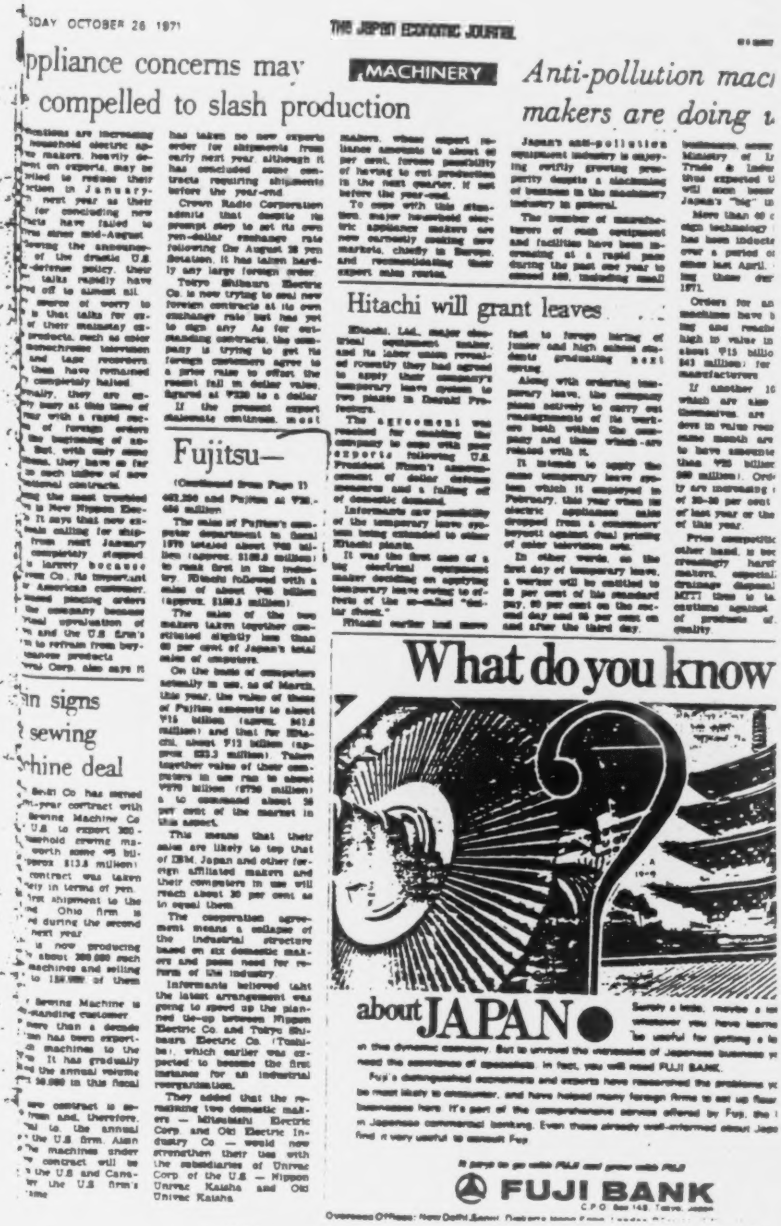
3) Tariffs on raw materials will be cleared for strengthening the international competitiveness of domestic industries.

4) The tariff gap for a part of Chinese products which are outside the ban of the Kennedy Round will be greatly narrowed.

5) Customs clearance operations will be simplified.

6) The tariff exemption system will be adjusted.

7) Domestic laws will be adjusted in conformity with changes of treaties relating to tariff listing and revision of the method for evaluating products.



SDAY OCTOBER 26 1971 THE JAPAN ECONOMIC JOURNAL

ppliance concerns may compelled to slash production

ations are increasing household electric ap- ce makers, heavily de- ent on exports, may be lled to reduce their ction in January- h next year as their for concluding new racts have failed to ze since mid-August. lowing the announce- of the drastic U.S. -defense policy, their talks rapidly have d off to almost nil.

source of worry to is that talks for ex- of their mainstay ex- products, such as color monochrome television and tape recorders, them have remained completely halted.

nally, they are ly busy at this time of ar with a rapid suc- of foreign orders the beginning of au- But, with only some tions, they have so far no such inflow of new ational contracts.

ng the most troubled is New Nippon Elec- It says that new ex- deals calling for ship- from next January completely stopped. is largely because own Co., its important American customer, posed placing orders the company because tual upvaluation of n and the U.S. firm's n to refrain from buy- panese products. wn Corp. also says it has taken no new exports order for shipments from early next year although it has concluded some contracts requiring shipments before the year-end.

Crown Radio Corporation admits that despite its prompt step to set its own yen-dollar exchange rate following the August 28 yen floatation, it has taken hardly any large foreign order.

Tokyo Shibaura Electric Co. is now trying to seal new foreign contracts at its own exchange rate but has yet to sign any. As for outstanding contracts, the company is trying to get its foreign customers agree to a price raise to offset the recent fall in dollar value, figured at ¥320 to a dollar.

If the present export stalemate continues, most makers, whose export reliance amounts to about 40 per cent, foresee possibility of having to cut production in the next quarter, if not before the year-end.

To cope with this situation, major household electric appliance makers are now earnestly seeking new markets, chiefly in Europe, and reconsolidating their export sales routes.

in signs sewing chine deal

[illegible] Co has signed n-year contract with Sewing Machine Co U.S. to export 300,- household sewing machines worth some ¥5 billion (approx. $13.8 million). contract was taken ely in terms of yen. first shipment to the Ohio firm is ed during the second next year.

is now producing about 300,000 such machines and selling to 130,000 of them

Sewing Machine is -standing customer more than a decade an has been exporting machines to the It has gradually ed the annual volume 30,000 in this fiscal

new contract is from and, therefore, al to the annual the U.S. firm. Also the machines under contract will be the U.S. and Canada the U.S. firm's ame

Fujitsu—

(Continued from Page 1)

¥62,290 and Fujitsu at ¥31,456 million.

The sales of Fujitsu's computer department in fiscal 1970 totaled about ¥38 billion (approx. $105.6 million) to rank first in the industry. Hitachi followed with a sales of about ¥35 billion (approx. $100.5 million).

The sales of the two makers taken together constituted slightly less than 60 per cent of Japan's total sales of computers.

On the basis of computers actually in use, as of March this year, the value of those of Fujitsu amounts to about ¥15 billion (approx. $41.6 million) and that for Hitachi, about ¥12 billion (approx. $33.3 million). Taken together value of their computers in use ran to about ¥270 billion ($750 million) a to command about 36 per cent of the market in this aspect.

This means that their sales are likely to top that of IBM Japan and other foreign affiliated makers and their computers in use will reach about 30 per cent as in equal them.

The cooperation agreement means a collapse of the industrial structure based on six domestic makers and paves road for reform of the industry.

Informants believed taht the latest arrangement was going to speed up the planned tie-up between Nippon Electric Co. and Tokyo Shibaura Electric Co. (Toshiba), which earlier was expected to become the first instance for an industrial reorganization.

They added that the remaining two domestic makers — Mitsubishi Electric Corp. and Oki Electric Industry Co. — would now strengthen their ties with the subsidiaries of Univac Corp. of the U.S. — Nippon Univac Kaisha and Oki Univac Kaisha.

MACHINERY

Hitachi will grant leaves

Hitachi, Ltd., major electrical equipment maker, and its labor union revealed recently they had agreed to apply their company's temporary leave system to two plants in Ibaraki Prefecture.

The agreement was reached for enabling the company to cope with poor exports following U.S. President Nixon's announcement of dollar defense measures and a falling off of domestic demand.

Informants saw possibility of the temporary leave system being extended to other Hitachi plants.

It was the first case of a big electrical equipment maker deciding on applying temporary leave owing to effects of the so-called "dollar shock."

Hitachi earlier had moved fast to forego hiring of junior and high school students graduating next spring.

Along with ordering temporary leave, the company plans actively to carry out reassignments of its workers both within the company and those which are related with it.

It intends to apply the same temporary leave system which it employed in February this year when its electric appliances sales dropped from a consumers' boycott against dual pricing of color television sets.

In other words, on the first day of temporary leave, a worker will be entitled to 80 per cent of his standard pay, 90 per cent on the second day and 95 per cent on and after the third day.

Anti-pollution maci makers are doing u

Japan's anti-pollution equipment industry is enjoying swiftly growing prosperity despite a slackening of business in the machinery industry in general.

The number of manufacturers of such equipment and facilities have been increasing at a rapid pace during the past one year to exceed 300, including small businesses, acco Ministry of In Trade & Indu thus expected t will soon beco Japan's "big" in

More than 60 c eign technology has been inducte over a period o since last April, ing those dur 1971.

Orders for an machines have b ing and reache high in value in about ¥15 billio $43 million) for manufacturers.

If another 10 which are also themselves, are dows in value reac same month are to have amounte than ¥25 billion $80 million). Ord ly are increasing of 20-30 per cent of last year or the of this year.

Price competitio other hand, is bec creasingly harsh makers, especial drainage disposal MITI there is la cautions against of products of quality.

What do you know

about JAPAN●

Surely a little, maybe a lo whatever you have learne be useful for getting a l on this dynamic economy. But to unravel the intricacies of Japanese business y need the assistance of specialists. In fact, you will need FUJI BANK.

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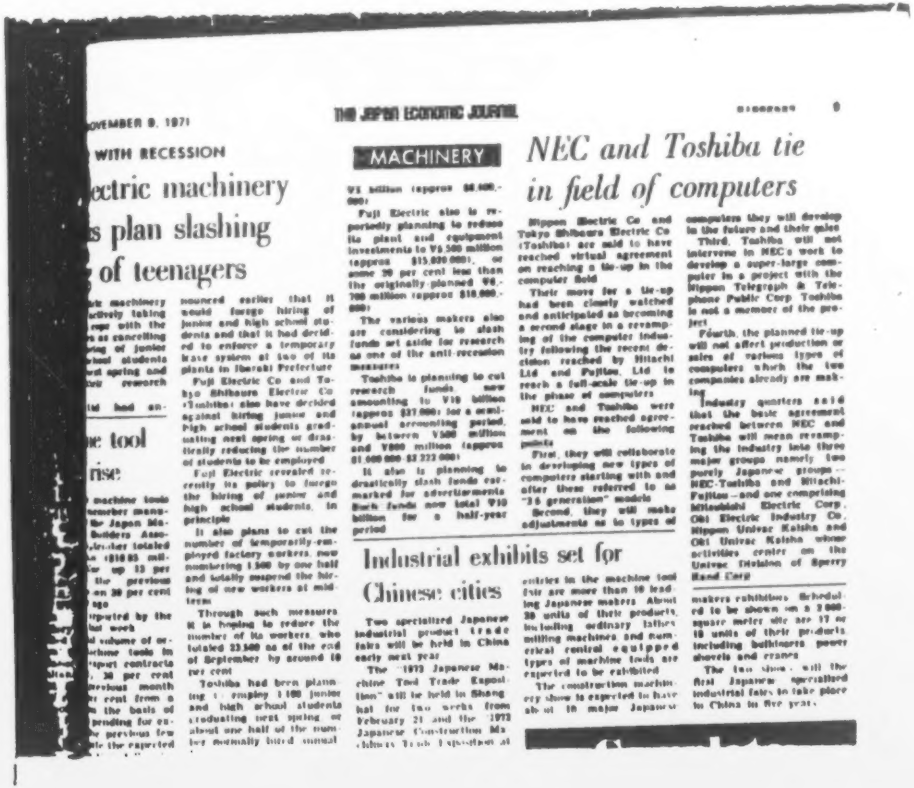

WITH RECESSION

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nounced earlier that it would forego hiring of junior and high school students and that it had decided to enforce a temporary leave system at two of its plants in Ibaraki Prefecture.

Fuji Electric Co and Tokyo Shibaura Electric Co (Toshiba) also have decided against hiring junior and high school students graduating next spring or drastically reducing the number of students to be employed.

Fuji Electric revealed recently its policy to forego the hiring of junior and high school students, in principle.

It also plans to cut the number of temporarily-employed factory workers, now numbering 1,300 by one half and totally suspend the hiring of new workers at mid-term.

Through such measures it is hoping to reduce the number of its workers, who totaled 23,300 as of the end of September by around 10 per cent.

Toshiba had been planning to employ 1,100 junior and high school students graduating next spring or about one half of the number normally hired annual

¥3 billion (approx $8,400,000).

Fuji Electric also is reportedly planning to reduce its plant and equipment investments to ¥5,300 million (approx $15,020,000), or some 20 per cent less than the originally-planned ¥6,700 million (approx $18,600,000).

The various makers also are considering to slash funds set aside for research as one of the anti-recession measures.

Toshiba is planning to cut research funds now amounting to ¥10 billion (approx $27,000) for a semi-annual accounting period, by between ¥300 million and ¥800 million (approx $1,000,000-$2,222,000).

It also is planning to drastically slash funds earmarked for advertisements. Such funds now total ¥10 billion for a half-year period.

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MACHINERY

NEC and Toshiba tie in field of computers

Nippon Electric Co and Tokyo Shibaura Electric Co (Toshiba) are said to have reached virtual agreement on reaching a tie-up in the computer field.

Their move for a tie-up had been closely watched and anticipated as becoming a second stage in a revamping of the computer industry following the recent decision reached by Hitachi Ltd and Fujitsu, Ltd to reach a full-scale tie-up in the phase of computers.

NEC and Toshiba were said to have reached agreement on the following points.

First, they will collaborate in developing new types of computers starting with and after those referred to as "3.5 generation" models.

Second, they will make adjustments as to types of computers they will develop in the future and their sales.

Third, Toshiba will not intervene in NEC's work to develop a super-large computer in a project with the Nippon Telegraph & Telephone Public Corp. Toshiba is not a member of the project.

Fourth, the planned tie-up will not affect production or sales of various types of computers which the two companies already are making.

Industry quarters said that the basic agreement reached between NEC and Toshiba will mean revamping the industry into three major groups, namely two purely Japanese groups — NEC-Toshiba and Hitachi-Fujitsu — and one comprising Mitsubishi Electric Corp, Oki Electric Industry Co, Nippon Univac Kaisha and Oki Univac Kaisha whose activities center on the Univac Division of Sperry Rand Corp.

Industrial exhibits set for Chinese cities

Two specialized Japanese industrial product trade fairs will be held in China early next year.

The "1972 Japanese Machine Tool Trade Exposition" will be held in Shanghai for two weeks from February 21 and the "1972 Japanese Construction Machinery Trade Exposition" at

entries in the machine tool fair are more than 10 leading Japanese makers. About 30 units of their products, including ordinary lathes, milling machines and numerical control equipped types of machine tools are expected to be exhibited.

The construction machinery show is expected to have about 10 major Japanese makers exhibiting. Scheduled to be shown on a 2,000-square meter site are 17 or 18 units of their products including bulldozers, power shovels and cranes.

The two shows will the first Japanese specialized industrial fairs to take place in China in five years.

[Excerpts from DENSHI BUHIN, December 12, 1971]

The Electronic Machine Industry Association's Committee on Semiconductor Affairs will begin its preparatory works to form a cartel for restricting IC production items under the Law Concerning Special Machines and Electronic Equipment. This [cartel] aims at the allocation of production items, the improvement of productivity, and the reduction of production cost within the nation's IC industry which is facing difficulties because of the U.S. makers' onslaught...

After such comparative surveys of the levels of technology among domestic IC makers, the cartel will determine a producer who can produce a specific item(s) on behalf of other makers...

One problem in its implementation is that, due to the rapid advancement of the IC technology, hierarchically rating the technological levels of various producers would be very difficult. Another problem is that, after the fourth liberalization of capital went into effect in August, which designated 50% of the civilian-use ICs to be free industrial items, U.S. makers began to make their approaches to out makers...

TUESDAY DECEMBER 14 1971
THE JAPAN ECONOMIC JOURNAL

MACHINERY

Electronics industry plans cartel for types of products using IC

The Electronics Industry Association plans working out arrangements with its members on forming a cartel for governing production of types of integrated circuit products on the basis of the law relating to specially designated electric machinery.

The cartel is aimed at planning production of certain types of products raising productivity and lowering costs owing to the aggressive competition of U.S. makers lately in the IC field.

The association is planning to complete all arrangements for enabling formation of the cartel in March next year.

It plans initially to make an investigation of the production technology of U.S. IC makers which are stepping up their offensive against Japan.

The association hopes to clarify the reason for Japanese makers being feared to be about one year behind their American counterparts in this field and the common troubles being experienced by them.

After this, the association intends to probe how makers are handling production and sales and find out the products in which they individually excel, particularly as the scope of the planned cartel is due to be wide ranging from linear ICs used for electric appliances to MOS LSIs for desktop calculator use.

On the basis of such survey, the association intends to work a cartel which will have a maker producing a type of IC product at the lowest cost undertake commissioned production for others.

Industry quarters said however that trying to find out which maker is superior in technology stands to be difficult owing to the swift pace of technology in this field. As such, they felt that reaching a conclusion on such aspects was going to take some time.

In August, this year, the fourth round of capital decontrol liberalized foreign investment in the field of ICs for use in manufactures up to 50 per cent.

Omron plans sales base in Europe

Omron Tateisi Electronics Co. has revealed its plan to establish a wholly-owned subsidiary — tentatively named Omron Europe Co. — in Europe next summer at the earliest in order to stage an active advance into this region.

The company has already built a strong foothold in the United States by establishing Omron Research & Development Co. and assembly plants for its desktop electronic calculators in that country. The company is planning to build a similar foothold in Europe.

According to the present program, Omron Tateisi Electronics will choose either Dusseldorf or Frankfurt in West Germany as the site of its European subsidiary.

Through the subsidiary, Omron Tateisi is planning to establish a joint venture in Europe for production of switches, relays and other controlling equipment. The company is already in negotiations with a leading European electric machinery manufacturer for a tie-up.

As Omron Tateisi Electronics already operates a sales joint venture in Europe by a tie-up with a British some electric machinery maker, the joint venture now under consideration will be the Japanese electric machinery maker's second joint venture in Europe.

Omron Tateisi Electronics also is planning to establish plants in Europe for production of desktop electronic calculators.

Mach. tool makers develop new versions

Machine tool makers lately have turned their attention to developing attractive new products with the aim of whipping up sluggish demand.

All of them are engaged in developing sophisticated versions of numerically-controlled or automated machines which contribute to economizing on labor.

Hitachi Seiki Co. recently developed a new machining center equipped with an automatic tool changer and a low-priced milling machine.

It earlier had commissioned production of some types of general-purpose milling machines and turret lathes which it cannot mass-produce to others for concentrating production on labor-saving machines, such as NC, specialized and automated versions.

Tsugami Corp., specializing in precision machinery, displayed a new multi-axis automatic lathe, a high-speed angular grinder and an optical wave meter at its regular private trade fair and has begun accepting orders for them.

As for Ikegai Iron Works, Ltd. it has developed numerical control lathe equipped with an AC device and plans its sale from next spring.

Hitachi Seiki also has started seeking orders for new, low-priced NC milling machines and shaping grinding machines which it has newly developed.

As for Roku-roku Sangyo, Ltd. it shortly is due to sell a new machining center equipped with a ATC system for handling 15 machine tools.

Nippon Seiko gets big bid

Nippon Seiko Co. has received a large scale inquiry for its automobile steerings from American Motors Corp. of the United States.

According to Nippon Seiko officials, AMC wants to buy 130,000 automobile steerings per annum for five years. If actually concluded, the contract will be by far the largest automobile parts export agreement sealed by a Japanese company.

Automobile industry informants say that it is quite exceptional for a U.S. motor vehicle manufacturer to conclude such a long-term contract covering automobile parts. The same sources also say that AMC is now trying to cope with Japanese automobiles by importing comparatively low-priced Japanese parts.

Nippon Seiko is the largest manufacturer of automobile steerings and is manufacturing them at a monthly rate of about 170,000 units. The company's sales of such products now run up to about ¥4,000 million (approx. $17 million) per annum. The company's exports, however, have so far been limited to only small shipments to Czechoslovakia. With the recent inquiry from AMC [illegible] however, the company [illegible] going to pla [illegible] on expa- [illegible]

Camera firms su selling to subsid

Major camera makers lately are switching their overseas sales systems from indirect marketing through agents
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Columbia cuts output of calculators

Nippon Columbia Co. has decided greatly to reduce production of desktop electronic calculators, because it is unable to keep up with the fierce price-cut competition in the industry.

Deliveries of desktop electronic calculators are declining alarmingly in recent months because of the wait-and-see attitude of retailers brought about by the almost endless plummeting of sales prices.

A total of more than 30 manufacturers is now engaged in production of desktop electronic calculators and the industry is one of the most fiercely competitive of all Japanese industrial fields. The "dropping-out" of Nippon Columbia will have considerable effects on the industry's almost inevitable reorganization.

Ever since it started production of desktop electronic calculators in the fall of 1968 under the brand name of Colm (export name Denon), Nippon Columbia has been one of the medium size manufacturers with its monthly production once hitting the 5,000-unit level.

Although the company's products enjoyed considerable popularity in their early days because of their high performance, their popularity waned because of the successive debut of low-priced products by many of the company's competitors as from last fall.

A Bank
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Don't you agree?
Maybe that' why we can't stop
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SAITAMA BANK

12

4 Computer Firms Agree on Technical Tieups To Reorganize Computer Industry in Japan

Honda to Export Cars to France

S.E. Asia Nations To Study Methods To Boost Exports

East Germany to Import 700,000 Tons of Roll Steel

Reach 80% Level of Last Year

Export Contracts Recovering

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CHALLENGES OF CRITICAL YEAR OF 1972

EDITORIAL

The acceleration of the inflow of foreign currencies since the beginning of last year eventually led to the substantial upward revaluation of the yen. During the eventful 1971, a host of other challenges confronted the Japanese economy—restrictions on textile exports to the U.S., enactment of preferential tariffs on products from developing countries, progress in import liberalization; rise of trade protectionism abroad; demand for higher oil prices by oil-producing countries; intense awareness of pollution problems and rising consumerism; prolongation and deterioration of the recession.

During last year, the bases for managing the huge structure of the Japanese economy thus underwent violent changes both domestically and externally. Among the factors for such changes, the impact of the yen revaluation is by far the most profound. Year 1972, which has arrived in the wake of that event of a profound magnitude, is destined to be a year of severe trial as to how adequately the Japanese economy, policy-makers, industrialists and individuals can adjust to new circumstances.

It is likely that business will start a course of gradual recovery around summer after losing momentum to a further degree during the first quarter. But the pace of the recovery will hardly be brisk. And, in the meantime, business failures may pick up and the annual spring labor offensive for pay increases will be characterized by sharp confrontation.

Many of the forecasts for the new fiscal yea

COMMENTARY

JAPAN AND THE JAPANESE

CAN THEY STOP WORKING HARD?

The implications of the first yen revaluation in Japan's history are understood to go far beyond the limited field of business and economy. A lot of fundamental and far-reaching meanings are read into this change of parity.

When the monetary meeting in Washington hammered out currency realignments, Shigeo Nagano, chairman of Nippon Steel Corp., remarked: "To date, not only the economic mechanism but the entire structure of the Japanese society has been built on the rate of 360 yen to a dollar, but now we must adjust to a new course of 308 yen."

In this way, the revaluation is viewed as heralding an entirely new ball game for the country. And such a situation is often referred to as one necessitating a turn-around in the way of thinking and mind.

In more concrete terms, the change in question signifies an end of an era placing a top priority on buildup of industrial capability, and the beginning of an era stressing elevation of public welfare and better living conditions.

This recognition stems from a reflection that the revaluation is the product of such economic policies in the past, in which process everybody has paid his share of sacrifice in the form of poor housing, worsening pollution, steep inflation and a host of other inconveniences and discomforts. There is also a keen realization that Japanese labor has been underpaid and overworked.

Lottery buyers stampeded to a ticket office in downtown Tokyo.

However, is the change in philosophy and sense of value something that can be accomplished so handily?

Already, misgivings and cynicism in this respect have been much in the press.

In putting forth such a dubious mind, some attack the "redoubtably conservative fiscal thinking" of the Finance Ministry officials. Others point out the absence of political leadership strong enough to lead the change.

Or, isn't it possible that Japanese, either on personal or institutional levels, may find it not easy to make a quick turn after a century of the national strife for industrial buildup and hard work?

Such misgivings are amplified by the fact that the immediate concern for business at present is to ride out the recession, which is already more than a year old and appears certain to come under an added impact from the revaluation.

Management is already busy advocating the need of aggressive hard work, and the reluctance about generous increases in compensation for workers. "This is not a time to talk about the luxury of five-day work-week," executives are saying.

If this becomes a feeling that dominates the business community, what will become of the lesson on the relationship between a strong yen and long hours of hard work not compensated sufficiently, or the logic for more benefit and longer vacation on the part of the labor?

If things go like this, as not a few people are concerned, it cannot be ruled out that the situation might be the same old stuff as what had led to the yen revaluation.

It is clear that what is arresting the popular mind at present is uncertainties and apprehensions regarding the adverse impact of the revaluation on everyday life. In the meantime, a record number of people took a chance in this year's annual year-end nationwide lottery which went on sale next day of the revaluation, offering ¥10 million to the first-prize winner. —M. Ishizuka

TEXAS INSTRUMENTS POSES THREAT TO IC MAKERS

Texas Instruments Inc is going to obtain a full ownership of Texas Instruments Japan, Ltd in which it has equally shared with Sony Corp since the foundation in 1968. The American company already has cleared the Japanese Government's Foreign Investment Council for increasing its interest in the Japanese subsidiary.

This move of the world's largest maker of integrated circuits (IC) is being viewed with considerable apprehension by the Japanese industry.

TI's full ownership of Texas Instruments Japan will, industrymen are concerned, not only give the American company freedom of activities in the Japanese market but also will add fuel to offensives on Japan by other leading American IC makers such as Motorola Inc and Fairchild Camera & Instrument Corp.

From the beginning, TI had been interested in starting its business in Japan with a wholly-owned subsidiary. But the strong resistance of the local electronic industry and the Government forced TI to comply with the Japanese demand to limit its interest in the Japanese operation to 50 per cent for three years and open its basic patents to local makers. A reportedly reluctant Sony was chosen as the local partner in the joint venture.

TI's complete takeover of the joint venture [illegible] nothing upsetting to Sony, however, says Masaru Ibuka, Sony board chairman. "We will not be affected at all as we have an IC and semiconductor division of our own."

In contrast, other leading Japanese IC makers are feeling a major threat from TI which presumably will pose square competition with them.

An executive of Mitsubishi Electric Co stresses necessity for domestic makers to pay greater efforts for technological improvement to reduce production cost to compete with TI.

"I am more concerned," remarks a Nippon Electric official, "about the possibility that the Japanese government's authorization of TI's complete takeover of its subsidiary may become an excuse for other American makers' demand for permission for wholly-owned subsidiaries here."

(At present, free entry of foreign interest into the area of IC production is limited to IC's for non-computer use and to a 50 per cent ownership.)

The third-ranking Fairchild Camera & Instrument has already been engaged in manufacture of IC's in Okinawa, while the second-ranking Motorola having a wholly-owned sales firm in Japan, is busy looking for a partner for launching a manufacturing operation

[Excerpt from NIHON KOGYO SHIMBUN, January 8, 1972]

In view of the worsening situation of domestic makers' profitability owing to the low-price offensive by the U.S. capital on the IC, the Ministry of International Trade and Industry began to deliberate a step toward the designation of the IC industry as a subject of cartel formation under the Provisional Industries and Special Machinery Industries Law. The ICs to be covered under the designation are TTL and DTL having 100 element value or below. MITI's aim in this move is to lower the production cost, to prevent excessive competition, and to stabilize price through a unified and concentrated production. It intends to implement the cartel formation by April after obtaining consent from the relevant makers.

DENPA SHINBUN
May 7, 1972

Electronic Part Industry Increasingly Oligopolized
Unbalanced Demand
Countermeasures before the boom

Oligopoly has increased in the electronic parts industry. Especially regarding electronic parts, there seems to be an unbalanced demand for all types of parts, such as switches, connectors, speakers, microphones, micromotors, magnet-heads, etc. Before summer, which is the best season for business, all companies are attempting to have countermeasures for it.

First quarter settlement of accounts has been announced by each company. The oligopoly's influence appears in every aspect.

Especially parts for which production has not increased show strong oligapolic trends.

As before, "shortsighted prices" had controlled sales. However, by reducing the price, the idea of importance of quality seems to be accepted.

The idea of total-cost in the electronics industry, invites more oligopoly.

For the manufacturing process, reducing total-cost which is from the design-stage to shipping-stage, is a must. Manufacturers which can reduce total-cost are only a few out of several hundreds of manufacturers.

Also, another reason to oligopolize is uncertainity of world economy because of value of the US high dollar.

make an order is to receive a stable supply.

Anyway, another reason to oligopolize is uncertainity of world economy because of value of the US high dollar.

The most important condition for assembling manufacturers to make an order is to receive a stable supply.

Anyway, the electronic part industry, especially color-TVs, cassette-recorders, etc., has been oligopolizing due to increasing demands. This trend seems to continue during the summer.

(Excerpt from KOGYO SHIMBUN, October 30, 1972)

At present, of the semiconductor intereted circuits, those with elements or below are import-free. The industry, therefore, argues that since 50% of our country's IC demands comprises those with 100 elements or below, one half of IC's are import-free.

On the other hand, whereas the United States already has a mass production system for the new processing technology such as iondrilling of P channel, C-MOS, SOS, and D-MOS, our country is still in the stage of research and development for them. If the complete liberalization were to take place at this juncture, we will be wiped out in the fields where we can expect future demands for IC, such as automobile, watch, and electronic organ.

With the lowering of tariff rate and the revaluing up of the yen, US IC makers' offensive against Japan is expected to become fircer. For the domestic industry which is already suffering from loss, the idea of complete liberalization cannot be accepted. . .

ASAHI (Full)
March 1, 1973

Liberalization of Electronic Computers and IC's Generally Decided; MITI to Hasten Implementation Measures

Import liberalization of electronic computers and IC's (integrated circuits), which has been pending, was generally decided on the 28th. This is due to the fact that on the same day, Prime Minister TANAKA summoned MITI Vice-Minister MOROZUMI and showed the posture of deeming it necessary to push import and capital liberalization positively. The Ministry, judging that a virtual decision has been reached on the import liberalization of electronic computers, intends to persuade the industrial circles concerned by about mid-March and formulate concrete implementation measures.

On the problem of electronic computer liberalization, agreement was reached two years ago, between the then MITI Minister TANAKA and the industrial circles, on the basic line that "capital liberalization will be effected three years hence, and import liberalization will not be effected for the time being." However, the U.S. side strongly demanded the liberalization of imports and capital because the rectification of the trade imbalance between Japan and the U.S. did not make headway. Moreover, U.S. Presidential Special Representative for Trade Negotiations EBERLE also emphasized it when he came to Japan.

After that, there arose the situation where the dollar was de-valued, followed by the yen's shift to the floating system. However, the U.S. side, taking the stand that currency adjustment is separate from the trade problem, showed the posture of not hesitating even to take such firm measures as to impose an import surcharge and raise tariff rates if Japan does not decide on import and capital liberalization. Within the Government and Keidanren, there was a growing atmosphere for thinking that Japan cannot but decide on the liberalization of electronic computers, which is a matter of the greatest interest to the U.S. even to prevent provisions aimed at discriminating against Japan from being incorporated in the 1973 Trade Act Bill which is scheduled to be presented to the Congress.

Recently, Keidanren requested the Government to "decide on the liberalization of electronic computers," and MITI Minister NAKASONE showed his policy for liberalization on such occasions as the Budget Committee meeting. Thus, the trend toward liberalization has been created gradually.

However, opinions opposing liberalization are still strong even in the electric machine industry circles and MITI, saying, "As competitive power is different, liberalization (of computers), if effected now, may result in throwing cold water upon the nurturing of the industry of intensive intellectual activity, which is being aimed at by MITI." Therefore, MITI leaders intend to unify the intentions within the Ministry, and at the same time make efforts for talks with the industrial circles in the future.

It seems likely that in that case, the Ministry will prepare the following "compromise plans": (1) Although liberalization of electronic computers proper (hardware) will be pushed, liberalization of utilization techniques (software) will be restricted; (2) when the Government and public offices and influential private enterprises are to adopt electric computers, the Ministry will give them guidance so that they will fix the ratio between imported goods and domestic products at fifty-fifty; and (3) liberalization two or three years ahead, for example, will be promised, instead of immediate liberalization.

SANKEI (Full)
March 1, 1973

U.S. Presses Japan with Appeal to GATT for Liberalization of Electronic Computers and IC; Heading toward Majority Vote; Notification Given at Time of Special Representative EBERLE's Visit to Japan

According to a clarification made by a Government source on the 28th, U.S. Presidential Special Representative for Trade Negotiations, EBERLE, who came to Japan recently, notified our country that if it does not decide to liberalize electronic computers and IC's, the United States will lodge an appeal with GATT. The time of the appeal is presumed to be April when a Directors meeting is scheduled to be held. If the appeal is made, our country will inevitably be driven into a tight spot, and in this respect, too, it will be pressed to liberalize electronic computers urgently.

According to the Government source, the United States, which has been demanding Japan's liberalization of electronic computers and IC's, has recently decided to lodge an appeal with GATT on the basis of Article 23 of GATT, on the grounds that Japan's import restrictions on electronic computers, etc., are unfair.

Through the Japan-U.S. NTB (non-tariff barrier) conference and the Japan-U.S. Joint Economic committee, the U.S. side has been demanding Japan's liberalization of electronic computers and so forth many times; therefore, judging that it has already met the condition of "holding consultations between the parties concerned before an appeal," which is stipulated in Article 23, it intends to lodge the appeal with the Directors meeting at one stroke.

According to the Government source's outlook, it is inevitable that our country, which is isolated with a marked surplus, will be beaten if the appeal is made to GATT, because its General Meeting already adopted the Resolution by a majority vote, and our country will be driven into liberalizing electronic computers and IC's on the basis of the said Resolution. Moreover, the United States is said to be firming up the intention of obtaining a GATT understanding at the same time with the said appeal, on its taking import restriction measures on electronic products which are our country's main-stay import goods to the U.S., on the basis of Paragraph 2 of Article 23. It is therefore expected that our country will suffer a "double punch," depending upon circumstances.

Therefore, the Government and MITI have immediately begun to check into concrete measures for the liberalization of electronic computers and IC's, partly because of Prime Minister TANAKA's liberalization instructions on the 28th. They are checking into deciding on complete liberalization and countering the U.S. by tariff measures and safeguards depending upon circumstances.

SANKEI (Full)
March 7, 1973

Another Reorganization Doubtful; Will Rather Cause Confusion: Statement by Japan Electronic Industry Promotion Association President DOKO on Electronic Computers

Japan Electronic Industry Promotion Association President Toshio DOKO called on Prime Minister TANAKA on the 6th and petitioned on emergency counter-policies for the problem of import liberalization of electronic computers and integrated circuits. After this, President DOKO held a press conference and said, "I received the impression that the time of implementation will be possibly moved up more than the time we hope for (April 1977). I am not thinking of the problem of another reorganization, because it will cause confusion at the present state and it will be difficult to produce effects." His statements are as follows;

1. We conveyed to Prime Minister TANAKA the same contents as those submitted to ITI Minister NAKASONE. Partly because he was ITI Minister at the time of the decision on capital liberalization, the Prime Minister understands the industry circles' position well. However, he said that the US demands are strong and that he does not know before negotiations are conducted. He did not refer definitely to the time of implementation, but I received the impression that the moving-up of the time from April 1977 will be possible.

2. We were asked by both the Prime Minister and ITI Minister NAKASONE whether the present structure for the

development of new models by three groups (Fujitsu-Hitachi, Toshiba-Japan Electric, and Mitsubishi Electric Machiner-Oki Electric) is all right or whether further concentration will not be conceivable. However, industry circles answered that even the re-organization into three groups was carried out with a resolute decision in consideration of the importance of industry circles, that even if they may be ordered to change it from now on, they cannot respond to it immediately, that it will rather cause confusion, and that whether it will be effective or not is doubtful. I have no such intention at all, now.

3. The problem of protective legislation is not limited to electronic computers, but it includes all problems. Arrangements should be made so that measures can be taken immediately in case of need, on the easiest point to do it.

ASAHI (Full)
March 8, 1973

"Co-Operation in Concentration Sought" -- Statement by ITI Minister.

ITI Minister NAKASONE announced on the 7th a statement to the effect that, "promotion of further tieup than the present three groups will be necessary," with regard to the problem of import liberalization of electronic computers in our country. Thus, he clarified MITI's view that the present situation where electronic computer industry circles within the country are competing with one another in disorder is improper to meet liberalization.

MITI judges that the six companies for home production, which are now divided into three groups, Hitachi Manufacturing-Fujitsu, Japan Electric-Tokyo Shibaura Electric, and Oki Electronic Industry-Mitsubishi Electric Machinery, cannot stand competition with the huge manufacturers of the United States, unless they deepen mutual tieup in commonization of the software and in taking shares in production and joint development of peripheral apparatus and unless they either unified into a home-production manufacturer like Britain's ICL in the future or are concentrated at lease into a group for specific purposes (Oki-Mitsubishi) and an alignment of electronic computers proper (remaining four companies). Explaining the Minister's statement of the 7th to the press, a MITI leader said, "For the present, this does not necessarily mean unification of industry circles, but the emphasis of the administrative guidance lies in promoting tieup among the three groups."

The gist of the ITI Minister's statement that day is as follows: (1) We are now carefully checking into the time of liberalization and counter-policies for it; (2) further tieup among the three groups will be promoted; and (3) there can be no case of any of the groups withdrawing, and MITI will give administrative guidance with the present three groups as the objects, to the last. Because there are some disturbances among industry circles to the effect that they do not understand the Government's views well, centering on the problems of tieup among the groups and another re-organization, [the ITI Minister] announced a statement and urged co-operation of industry circles.

ASAHI
March 8, 1973

Invocation of Emergency Tariff System; Being Checked into by MITI for Protection of Industry Circles -- Another Reorganization of Electronic Computer Industry Circles

With regard to liberalization of electronic computers, MITI began to check on the 7th into legislative measures including consolidation of the emergency tariff system in order to prevent blows to domestic industry circles in the future.

MITI thinks that upon liberalizing imports of electronic computers, another re-organization of industry circles within the country will be necessary together with handsome financial measures for them. However, these cannot be said to be sufficient as counter-policies to meet cases of a sharp increase in imports of American products, etc. Thus, MITI intends to establish a system under which domestic industry circles can take "emergency shelter", to speak, by making use of the emergency tariff system stipulated in the present Customs Tariff Law.

The emergency tariff system is a mechanism under which import tariffs on some specific goods can be raised by the Government authority in case imports of those goods increase suddenly and the domestic industries handling those goods are liable to be subject to serious losses.

According to MITI, this is because of political consideration for the other countries but, at the same time, because procedures for invocation are not fully consolidated under the present Law. Accordingly, it is MITI's view that it wishes to revise it into a flexible system so that it can be invoked automatically in case losses further increase. "the first consideration should be to bring up this electronic computer as a machine to counter IBM, for some time to come. Arguments for starting with a clean slate, which would scrap that machine, are nonsense, after all" (Japan Electronic Industry Promotion Association President Toshio DOKO). These voices are strong.

Industry circles are, therefore, taking the view that if another re-organization is to be realized, there is no way which would be conceivable but to go under private circles' leadership, depending upon the future development of enterprise competition.

MAINICHI (Full)
March 8, 1973

Will Eastern Liberalization of Electronic Computers; Strengthening of Tieup among Three Groups-- MITI Policy

With regard to liberalization of electronic computers and integrated circuits, which is one of the focal points of the current trade problem, linked with the currency crisis, MITI is promoting the drawing-up of concrete policies for the time and counter-policies. ITI Minister NAKASONE on the 7th announced a statement to the effect that "With the three groups as the premise, the strengthening of their tieup will be promoted." Concerning the industry circles' structure which is anticipated to undergo another re-organization together with the implementation of liberalization, MITI intends to strengthen the tieup among the three groups for the time being, such as internal and mutual joint sales, taking of shares in production and promotion of research and development. MITI administrative authorities have firmed up a policy to the effect that they cannot but implement liberalization in two or three years from now by moving up the time more than the line demanded by electronic computer industry circles. They have thus decided to seek Government leaders' decisions. This is because they have come to have the intention that the United States will not be convinced by the industry circles-proposed line of implementation of liberalization four years from now and will further strengthen its trade offensives against Japan, and that in response to this, Prime Minister TANAKA will have to offer concessions, in view of the U.S. demand for liberalization.

As to the liberalization of electronic computers and IC's, industry circles met ITI Minister NAKASONE and Prime Minister TANAKA on the 5th and the 6th and clarified their accepting of liberalization presenting the following conditions: (1) Import liberalization of electronic computers and 50% capital liberalization of software shall be four years from now, and [liberalization] of IC's three years from now. (2) As a collateral, liberalization countermeasures funds totaling ¥147,500 million, including subsidies for strengthening the sales structure of JECC (Japan Electronic Computer Company, Ltd.) will be added.

As a result, liberalization of electronic computers and IC's was virtually decided, and the focal point has been narrowed down to what to do about the time of implementation of liberalization in the future and to what extent the Government will offer financial and monetary aid measure as "compensation." Especially, the time of implementation is a big focal point. MITI intends to take a resolute step to move up the time, for the following reasons: (1) Liberalization four years from now, as demanded by industry circles, is "understandable as industry circles' assertions" (ITI Minister NAKASONE), but it is far from the severe demand of the United States and will easily be rejected. (2) Prime Minister TANAKA, too, emphasized early implementation, at his talks with the leaders of industry circles on the 6th.

On the other hand, as regards the problem of the industry circles' structure accompanying liberalization, the ITI Minister announced a statement to the following effect that day: "Promotion of further tieup of the present three groups will be necessary. There can be no case of any of the groups withdrawing at the present stage, nor is MITI thinking of giving such administrative guidance." Thus, he clarified that (MITI) will strengthen the internal or mutual tieup among the three groups for the present, with Hitachi-Fujitsu, Toshiba-Japan Electric, and Oki Electric-Mitsubishi Electric Machinery as the premise.

NIHON KEIZAI (Full)
March 8, 1973

Will Not Carry out Another Re-Organization--Electronic Computer Industry Circles

Home-produced computers manufacturing industry circles, having raised sharp opposition to some reports on "another re-organization of home-produced [electronic computers] manufacturers into one group" and "concentration into two groups of native capital affiliation and semi-foreign capital affiliation, and withdrawal of the Japan Electric-Tokyo Shibaura Electric Group," strongly stated that they have no intention of another re-organization at all. This is because the main force should be concentrated on the strengthening of ties under the present three-group structure which is finally about to attain the actual results of tieup and re-organization and because disregarding efforts in this field and considering another re-organization which will re-orient the map of industry circles will only cause them to be taken advantage of by the foreign capital-affiliated enterprises and will not lead to the nurturing and strengthening of the home-produced electronic computers manufacturing industry.

The plan to unify six manufacturers of home-produced electronic computers into one group remained deeply rooted in some quarters, it is true, on the grounds that even the three groups were insufficient, from the time when the present three-group structure of Hitachi Manufacturing-Fujitsu, Japan electric-Tokyo Shibaura Electric, and

Mitsubishi Electric Machinery-Oki Electric Industry was established in the fall of the year before last. The total sum of the proceeds of the six companies for home production does not reach even one tenth of those of IBM, and their share in the world market accounts for only 3 to 4% at the most. Moreover, there are striking differentials in every field, whether technical development power, financial power, or selling power. Even if the companies were to be integrated into three groups, that would only result in waste of taxes, and forces countering IBM could hardly be nurtured. These were their grounds [for a unification plan].

However, "Electronic computers should be called machines with thought, rather than mere industrial products, and unification of the manufacturers who had been promoting development of electronic computers with different thought, respectively, will only cause confusion technically and in personnel, and it will take a considerably long period of time before new electronic computers are developed under unified thought" (Japan Electric Executive Director Yujiro DEGAWA). Moreover, as a result of unification, the principle of effective competition may cease to work and [the manufactures] may possibly be led to a situation where they will sit back at ease, relying on a system of receiving orders under the protective umbrella of "big boss Rising Sun," so to speak.

As a matter of fact, British ICL (International Computers) is a semi-governmental state-policy company which was born through the merger of the British manufacturers contesting with one another in disorder. For this reason, because of the management structure totally dependent upon the Government and the management attitude lacking harmony, ICL recently is panting in a "dying condition," continuing to be inactive.

Furthermore, the present three-group structure has already started moving, and an electronic computer developed with the research and development subsidies of the Government is to raise the "first cry" of its birth even as early as within this year. For this reason, from now, 50% liberalization of investments in used techniques (software), and liberalization of integrated circuits three years from now--will not serve as a conclusive factor for a policy to balance foreign payments, judging from the situation surrounding Japan, such as the balance of trade with the United States and the return of the yen to a fixed quotation. For this reason, they intend to promote persuasion toward industry circles under the dual setup of moving up the time of liberalization and strengthening the structure of the industry circles within the country by means of another reorganization.

Japan Electronic Industry Promotion Association President Toshio DOKO (Toshiba Board Chairman) and others met Prime Minister TANAKA on the 6th and petitioned on counter-policies for industry circles. Prime Minister TANAKA pointed out that (1) since the U.S. side's voices calling for import liberalization of electronic computers are strong, the time of liberalization may not be as planned by industry circles, and (2) I would like you to promote another re-organization in accordance with the MITI plan. In reply, industry circles show a negative posture to the effect that they will leave the time to the political judgment of the Government but that another re-organization is a problem for the future.

The Government fully understands the difficulties facing home-produced electronic computers manufacturing industry circles, because Prime Minister TANAKA as the then ITI Minister in 1971 decided on the capital liberalization plan for electronic computers and the financial measures for that purpose. However, since the problem of balancing with foreign countries has become far more important than two years ago, the Government has firmed up a severe view that if industry circles demand protection, a receiving structure and enterprise efforts worthy of protection will be necessary. The Government is dissatisfied with the point that the results of the three-group structure, which began to move substantially from the beginning of last year, are limited to the joint research and development within each group even at present when about a year has passed since then and that in the field of sales, deficit-competition centering on discount sales is being carried out.

On this point, the government is attaching importance to the actual situation where the huge manufacturers of the United States, especially IBM, are pressing with their superiority of techniques, without taking such means as discount. The Government has a strong sense of crisis, to the effect that under the present situation, the mutually pulling at their legs within the country will continue, no matter how many financial measures may be taken. For this reason, the Government intends to use the industry circles' intentions as "basic material." It intends to seek strongly the "compensation" of unification of the manufacturers within the country, for counterpolicies by means of financial measures.

NIHON KEIZAI (Full)
March 15, 1973

MITI HEADING TOWARD REORGANIZATION OF IC ENTERPRISES

Adjustment of Production Fields Planned for Six Exporter Firms in Preparation of Liberalization

Liberalization of the import of integrated circuits (IC), as well as that of electronic computers, is already a matter of time. MITI revealed on the 14th that it has begun checking into concrete problems, with a determination to start efforts for reorganization of the IC manufacturing enterprises as part of the countermeasures again liberalization. Of the 12 IC manufacturing enterprises in Japan, six depend largely on foreign markets. MITI's plan is to have the fields of production adjusted among these firms so that each firm can specialize in a specific production field, for establishment of a division of labor. It is expected, however, that MITI's reorganization plan will cause great ripples, because of the IC manufacturing firms have been exerted great efforts to strengthen their international competitive power prior to the liberalization of IC imports.

Following the presentation of a strong demand by the US for correction of the imbalance of Japan-US trade, the Government and business circles have begun to move toward liberalization of IC imports, as well as that of electronic computer imports. Consequently, IC manufacturers, too, have become inclined to think that, "liberalization is unavoidable." They are strongly asking the Government to carry out liberalization in April, 1976, and offer a subsidy amounting to ¥7 billion for promotion of technical development as part of the countermeasures against liberalization.

MITI has made up its mind to reorganize the IC enterprises, for the following reasons: (1) The IC enterprises may suffer a sever blow if IC imports are liberalized while they are in such a condition as at present, because indigenous IC production has been started only recently; (2) If liberalization is carried out, the big American IC manufacturers may start a vigorous export offensive on Japan, as they did in Europe, to overrun the Japanese market and crush indigenous IC production; (3) Japan must foster IC manufacturing enterprises at home, because the IC is to become the foundation for the electronic industry.

At present, there are 12 IC manufacturing enterprises in Japan. MITI wants to select about six out of these enterprises which are more dependent on export than others, including Japan Electric, Hitachi and Tokyo Shibaura Electric, as enterprises to be fostered according to its policy. The reason is that MITI has decided it is not proper to apply its liberalization countermeasures to those enterprises which are turning out IC's only for incorporation into their own products, because such IC production is different in character from IC production as an independent industry. From this point of view, MITI will divide IC manufacturing firms into several groups to specialize in the respective fields of production, such as bi-polar machines and metal oxide semiconductors (MOS), so that a division of labor will be established among them. It says this step will help to promote mass production in the respective fields and improve the technical level by the exchange of technical information. MITI is planning to subsidize the efforts for establishment of such a production structure, as part of its countermeasures against liberalization.

It can be anticipated, however, that the IC enterprises will offer strong resistance against the plan which will force them to give up production of the items they have just developed, and specialize in specific items, at this time when IC production in Japan is still on its way to development. MITI's reorganization plan is likely to cause heated discussions among those concerned, in connection with such problems as the date for liberalization of IC imports and liberalization of electronic computer imports.

NIHON KEIZAI (Full)
March 16, 1973

EDITORIALS

Countermeasures Against Computer Liberalization Lack Severity

The problem of liberalizing electronic computer imports has entered a stage where high-level political adjustment is necessary for its solution. High-level political solution does not mean a "hasty political solution" in the form of total acceptance of the wishes of the US side planned by Government leaders at the beginning. Nor does it mean that the Government should carry out the liberalization only slowly while strengthening financial assistance to the computer enterprises, according to the demand of computer industry circles for liberalization of imports of the main body of computers in or after April, 1977 (that of integrated circuit imports in april, 1976, and 50 per cent capital liberalization in the field of software in April, 1977). It means the establishment of a realistic strategy whereby the positive significance of liberalization will be reviewed on the basis of a careful analysis of the reality and future prospects of the competitive power of the Japanese computer industry, so that the Japanese enterprises and the enterprises run by foreign capital can exist together, while maintaining a balance between co-operation and competition.

The idea of reorganizing again the three groups in computer industry circles into one group has been reported in some circles. It is clear, however, that it is problematical to implement such an idea forcibly, in view of the strong resistance offered by computer industry circles against this idea and the failure suffered by International Computers of Britain (ICL). A new kind of electronic computer, which has been studied and developed with an enormous subsidy of the Government, may be completed within this year. We can understand, therefore, the desire of computer industry circles to foster this kind of computer in order to counter IBM.

For development of the production of new computers, however, the computer enterprise must promote co-operation and concert among themselves even further, in the fields of technics and sales. Also in view of Japan-US economic relations which are becoming more and more strained, it is necessary for computer enterprises to strengthen such co-operation and concern with a stern attitude not in the past sense of the words. From this point of view, it is necessary for computer industry circles to implement co-operation and concert among different groups of enterprises in such fields as peripheral machines and software, as well as the tieup in the fields of sales among enterprises of the same group which Tokyo Shibaura Electric and Japan Electric are already planning. It is also necessary to check into the present system of three groups thoroughly again in connection with the problem of developing and fostering new types of computers, with greater emphasis on complementary relations on rivalry.

Way to Co-Existence with IBM

The most important problem to be studied by Japanese computer industry circles in the establishment of countermeasures against the liberalization of computer imports is when the Japanese enterprises will become able to counter the strength of IBM, which is the most powerful computer enterprise in the world, in the fields of technical development and marketing, on an equal footing. Probably any person, who is aware of the present reality, will say it will be difficult for the Japanese enterprises to gains such ability, even in that considerably distant future. The Japanese computer enterprises, which were left far behind their foreign competitors in starting efforts for development of technics and expansion of sales, have been able to prevent IBM, which holds a share of 60 per cent in the world market, from expanding its share in the Japanese market and to maintain a share of about 50 per cent in the home market, only by relying on import restrictions and the Governments' powerful assistance.

IBM 370 Series, which were made known to the world in July, 1970, shocked the world's computer manufacturers profoundly. Japanese computer reorganized themselves into three groups for development of new computers of the 3.5th generation to rival the 370 Series. All new kinds of indigenous computers are to be completed next year, but it is said that IBM will announce its completion of another new epoch-making kind of computer in 1977. If so, we must think that the road ahead of indigenous computer production is rough. At present, the Japanese computer enterprises as a whole are gaining a greater ability to develop technics than West European manufacturers. Even the establishment of co-operation with West European manufacturers, however, will only produce a limited effect as a means of Japanese enterprises to counter IBM. In view of the present ability and structure of the Japanese computer industry, it will also be difficult, even in the future, for Japanese computer enterprises to compete with IBM directly, in the field of hardware centered on large machines, if not in the production of medium and small machines.

It is not necessary for the Japanese computer enterprises to compete with IBM in all fields for survival. Also there is no need for the Government to pour money into the field of the computer industry without a definite prospect or plan, only adhering to the policy of giving top priority to home production. The basic policy of building an advanced, diversified industrial structure and developing the industries dependent on the concentration of knowledge, which has been followed by the Government, is not mistaken. It is natural that the Government should endeavor to foster and strengthen the computer industry which is to hold a key position in the new industrial structure. In such efforts, however, the Government and manufacturers should not concentrate on "fruitless competition" with IBM and other foreign enterprises, but establish measures for mutual reliance and co-existence between Japanese and foreign enterprises as early as possible.

One conceivable way for Japanese enterprises to establish mutual reliance is to specialize in the development of the related instruments and peripheral machines to be needed by the big, super-advanced electronic computers which will be developed by foreign capital four or more generations later, with consideration for the foreign enterprises' ability to develop such computers. Also it will not be impossible for Japanese enterprises to develop soft-ware suited to the actual situation in Japan, separately from the hard- and soft-wares to be developed by IBM, for establishment of co-existence with IBM. Needless to say, it is problematical, as the computer manufacturers contend, to treat the soft- and hard-wares separately from each other. It is impossible for us to ignore completely the fact that the present system for development of computers is based on the view that "There can be no soft-ware without hard-ware." Yet it will not be impossible for Japanese enterprises to establish such co-existence relations with IBM, if they redouble efforts for development of soft-ware and open a new field of production for themselves.

Improve System for Development of Soft-Ware

Even in the US, which is a colossal, multinational enterprise representing a "Gulliver-type monopoly," has been a cause for the smouldering discussions on the partition of big enterprises. In Japan, too, the establishment of an international charter for enterprises, including Japanese enterprises, has been a problem in connection with the activities of multi-national enterprises. It will become necessary, therefore, to check into IBM's domination of markets separately, on the political and administrative levels. Apart from such necessity, however, it is advisable for Japanese computer industry circles to step up talks about co-operation involving mutual reliance or virtual division of markets, for establishment of desirable relations with IBM in the future.

SANKEI (Full)
March 27, 1973

Industrial Circles' Plan Out of Question -- Liberalization of Electronic Computers; EBERLE Expresses Strong Dissatisfaction

A Government source clarified on March 26, that at a meeting of the OECD New Executive Committee, earlier held in Paris, US Special Representative for Trade Negotiations EBERLE expressed the view that "the plan for the liberalization of electronic computers and IC's (integrated circuits), which plan has been proposed by Japanese electronic computer industry circles, will be out of the question." MITI intends to formulate a Government plan on the basis of the liberalization plan of electronic computer industry circles, with around the middle of next month as the target time. However, the Government's plan is likely to become a still severer plan, because the US Government is dissatisfied with the plan of industrial circles concerned.

The OECD New Executive Committee held a meeting in Paris for two days, that is, on March 19 and 20. After the Committee meeting, EBERLE, who attended the Committee meeting, informally expressed the following view to the Japanese Delegation in a severe tone: "The liberalization plan of the electronic computer industry circles is out of the question."

The liberalization plan, formulated by Japanese electronic computer industry circles, is as follows: 1) The import liberalization of electronic computers and capital liberalization (50 percent) of the soft-ware industry will be carried out in April, 1977; and 2) the import liberalization of IC's will be carried out in April, 1976. This is also a large scale concession plan which has been secured as a result of MITI's persuasion activities carried out toward industrial circles concerned early this month.

Therefore, MITI has appreciated the liberalization plan of industrial circles concerned, saying that "this is the maximum line on which concessions can be made, and if further concessions are made, then our country's electronic computer industry circles will collapse" (Heavy Industry Bureau Director General Eiji YAMAGATA). MITI had also solidified its intention of formulating a Government plan along the line of the plan of industrial circles concerned by around the middle of this month (TN:sic).

However, Special Representative EBERLE has expressed, though informally, a view of rejection. Therefore, it has become clear that the US side is demanding still stricter liberalization by our country's industrial circles concerned. MITI is racking its brains in an attempt to formulate countermeasures.

Therefore, MITI is checking into remedial measures, such as moving up further the time for carrying out the proposed liberalization. It is also held certain that MITI will be forced to adjust views with industrial circles concerned.

Furthermore, the OECD New Executive Committee meeting was also participated in by Special Representative EBERLE and Undersecretary of State CASEY (in charge of economic affairs), from the US side, and by Foreign Affairs Councillor Kiyohiko TSURUMI, MITI Trade Bureau International Economic Affairs Division Director Naohiro AWAYA, and others, as Government Delegates, from the Japanese side. The Committee meeting was also participated in by Vice-Minister-level or Deputy Vice-Minister-level delegates from various other countries of the world.

NIHON KOGYO (Full)
April 3, 1973

MITI to Hasten Counter-Measures on Electronic Computer Liberalization, Including Consolidation of Emergency Tariffs and Establishment of "Tariff Investigator" System to Watch Prices

The Government intends to clarify the time for import liberalization of electronic computers and integrated circuits (IC) even as early as the middle of this month. In response to this, MITI has decided to hasten domestic counter-measures for the liberalization. In concrete terms the Ministry will check into the following measures: (1) Consolidating the conditions and procedures for the imposition of emergency tariffs and tariffs on unfair dumping, and making a basic re-study of the tariff system, and (2) establishing a "tariff investigator" suspected of dumping. Especially in regard to electronic computers, there are wide technical differentials between Japanese and American manufacturers, and US IBM's offensive against the Japanese market is expected to intensify further; therefore, MITI wants to revise the current Anti-Monopoly Law so as to prevent IBM products' "market monopoly" or establish separate protective legislation, such as an "Electronic Computer Promotion Law," as occasion demands.

The industrial circles are showing the policy of deciding to liberalize the import of electronic computers four years hence, that is, in April, 1977, and IC's three years hence, that is, in April, 1976. However, MITI thinks that this plan of the industrial circles will be unable to ward off fully the US demand for Japan's opening its market, and that the time for the liberalization cannot but be moved up. As moving up the liberalization time fixed by the industrial circles will have big effects on domestic industries, the Ministry has decided to establish domestic counter-measures accompanying liberalization in a hurry.

Both emergency tariffs and tariffs on unfair dumping are institutionally recognized under the current Customs Tariff Law, but there is no complete Government ordinance fixing the conditions for the imposition of these tariffs. Therefore, it is actually impossible to impose them. For this reason, the Ministry intends to finalize urgently the imposition procedures including the establishment of tariff rates and an organ to decide flexibly on whether or not to impose these tariffs.

On the other hand, tariff investigators are to be stationed at Japanese embassies abroad on a permanent basis and perform the duty of investigating the selling prices in producing countries as to imports on which communications are sent from the homeland Government to the effect that they are suspected of dumping, and proving the fact of dumping. This sytem is already established at the American and Canadian Embassies in Japan.

These systems cannot be carried out unless there are such conditions as a "sudden increase in imports" and "unfair dumping," in regard to imports. Therefore, it seems impossible to place great expectations on the effects of these systems as measures to cope with IBM, which is said to be planning to increase its share by its technical differentials from domestic manufacturers, without selling at reduced prices. Moreover, they have the weakness of being unable to prevent the products of IBM-Japan, a Japanese corporation, from expanding its market.

Therefore, there is a growing view that "natural monopoly" by the products of IBM-Japan should be countered by revising the Anti-Monopoly Law. On the other hand, however, there is an argument doubting the possibility of such a revision because the Law follows the principle of banning monopoly through enterprise absorption or amalgamation. In addition, it is problematical, from the standpoint of commercial rules, to restrict the actions of a specific foreign enterprise called IBM. Therefore, MITI intends to check into such problematical points, and, in regard to electronic computers, it is thinking also of enacting a special law virtually to protect domestic manufacturers by promoting them.

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start joint ventures in Brazil and Argentina with local interests to construct oil refining and petrochemical plants in those countries.

In a similar fashion, Japan Gasoline Co. will shortly launch a venture in Singapore jointly with a local contractor. The joint company is aimed at procuring labor and materials to be used in Japan Gasoline's projects in Southeast Asia.

Big trading companies engaged in plant exports also are building overseas marketing networks of plant and equipment.

Mitsui & Co. has established a subsidiary in Luxembourg charged with procurement of materials from the U.S. and Europe in cooperation with Toyo Engineering Co. Mitsui plans to set up a similar subsidiary in New York.

Mitsubishi Corp. and Ma-

Fujitsu and Matsushita tie

Fujitsu Limited and Fuji Electric Co. have reached a tie-up with three Matsushita group firms in the field of minicomputers and facsimiles.

The Matsushita firms are Matsushita Electric Industrial, Matsushita Communication Industrial and Matsushita Graphic Communication Systems.

They are going to set up a new company for undertaking development, manufacture and sales of minicomputers.

The new joint venture is destined to command an about 30 per cent share of the domestic minicomputer market and become the biggest of any of the over 30 companies now engaged in such production.

The joint firm to be set up in Kawasaki City. The investment ratios will be 35 per cent for Fujitsu, 15 for Fuji Electric, 20 per cent for Matsushita Electric Industrial, 25 per cent for Matsushita Communication and 5 per cent for Matsushita Graphic Communication Systems.

It will undertake research on development on main and peripheral units of minicomputers and software as well as manufacture and sales.

equipments.

Only one LSI is used for tiny computer

Japan's first micro computer that features use of one large-scale integration unit and no integrated circuit as its operating core has been developed by Tokyo Shibaura Electric Co. (Toshiba).

The company said the processor — the hard-core control device—of its new computer consists of just a single LSI unit made up of 11,000 transistors.

Observers believed this meant the Japanese LSI application technology had attained the same high level as the U.S. in this area because hitherto the best known micro computer marketed last year by Intel Corp. of the U.S. depended on one LSI unit and four integrated circuit units.

The micro computer is a handy variety of the electronic computer and just as efficient as the mini-computer and yet is only 1/10th as expensive, though its wide application has yet to be seen.

Toshiba's micro computer also features the use of an LSI unit for its external memory.

The computer is capable of directly accepting up to 4,000 words from the memory device. It averages 50,000 rounds of calculations a second. It needs only 0.8 watts of electricity and works under a very wide range of atmospheric temperatures between 40 degrees below zero to 125 degrees C.

Printing firm

Marubeni Corporation and Harris-Intertype Corp. of the U.S. have signed an agreement to form a joint venture company called Marubeni-Harris Printing Equipment Co.

The new company, to be headquartered in Tokyo, will sell and offer after-sales service in Japan for printing press and bookbinding equipment, and various accessories, parts and materials related to such equipment.

troduced by some major banks along with automatic holiday and nighttime depositing machines, had been on a steady growth because of the essential merit of such automatic teller apparatus to save labor. Observers believe the growth of demand for cash dispensers has also been spurred up by bankers' current rush to improve their customer services from fear that the present bitter public censure of domestic traders for their "inflation-causing speculative" domestic commodity dealings might spread to the commercial banking community.

Cash dispensers installed on banks' office building fronts for paying out cash on a customer's insertion of his magnetic card as part of the terminal equipment of each bank's electronic computer system have been regarded by Japanese bankers as an effective answer to their dual problem of introducing the five-day workweek system without losing their customer service efficiency.

Bankers have their own official additional reason to demand more cash dispensers—1) A current computer system card unification drive among Japanese commercial banks, and 2) the Finance Ministry's plan to permit each commercial bank to have at least one off-the-office cash dispenser of on-line type by the end of this coming September in addition to its office-front ones.

Omron Tateisi Electronics Co., a pioneering cash dispenser maker, has found its such production with its own factory.

Omron Tateisi said it is now deluged with bank orders for 2,500 units of such machines and can safely expect its current sales of such equipment to run up to seven or eight times the last annual total of ¥1,300 million (approx. $4,220,000).

Fujitsu Limited, another leading maker, said it also has on hand bank orders for some 2,000 units of such machines and is now nearly tripling the 50-unit-a-month capacity of its Minamitama factory in Tokyo.

Pioneer will take up CATV

Pioneer Electric Corp. recently bared it is going to advance into the cable television (CATV) business in a tie-up with Oki Electric Industry Co.

It decided to do so at the request of Warner Communications Corp. of the U.S., with which the company is in a tie-up in the record division.

The U.S. company controls Television Communications Co., the second largest CATV operating company in the United States, but does not have a CATV equipment manufacturing division.

Thus, it requested Pioneer to manufacture intermediary transmission equipment, such as trunk amplifiers, bridging amplifiers, line extenders and tap offs, for it.

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Japan Economic Journal

June 12, 73

NIHON KEIZAI (Full)
June 15, 1973

Import Liberalization During 1975; Cabinet Decision on Electronic Computers Expected Today

ITI Minister NAKASONE will report to the Cabinet meeting on the 15th that "imports of electronic computers will be liberalized during 1975" and will obtain Cabinet approval. With this, the electronic computer liberalization question, which was the biggest focal point in U.S.-Japan trade problems, will be settled in both the capital and import fields. After the Cabinet meeting on the 15th, the Government will convey this decision to the U.S. Government, through the U.S. Embassy in Japan, on the one hand, while on the other, it intends to give guidance to the industry circles concerned, for the promotion of the consolidation of their structure, with an eye to liberalization in 1975. Through the deciding of "liberalization during 1975," electronic computer imports will be liberalized even as early as in one year and seven months, if early, and within two years and seven months at the latest. This will be a large-scale moving up of the liberalization date, compared with "liberalization, four years from now," which was desired by the industry circles concerned.

As regards the liberalization of electronic computer imports, the industry circles concerned had been desiring liberalization, four years from now. However, as against this, MITI advocated liberalization three years from now, while Prime Minister TANAKA called for liberalization two years from now. Under the circumstances, study had been continued within Government circles, regarding the time for liberalization. MITI gave leeway to the time for liberalization, in the form of liberalization during 1975, because it desires to make final decision on the time for liberalization after taking these circumstances into consideration and after watching the moves of the U.S. Goverment.

The Government, after the Cabinet meeting on the 15th, will transmit this policy for "liberalization during 1975" to the U.S. Government. According to the impression received by the Government through the U.S. Embassy in Japan and others, the U.S. Government seems to have very privately agreed to this decision, and this will mean that the liberalization of the imports of electronic computers, which was thought, at first, to become the "star item" at the meeting of the Joint U.S.-Japan Committee on Trade and Economic Affairs, to be held on July 16 and 17, will see settlement before the Economic Conference.

The Cabinet has already decided on the end of 1975 as the time for capital liberalization for electronic computers. Therefore, its deciding on import liberalization during 1975 will mean that electronic computers will be completely liberalized by the end of 1975, at the latest, and that competition between domestic and foreign capital will be further intensified.

In the future, negotiations will be held between MITI and the Finance Ministry on the strengthening of the international competitive power of the electronic computer industry circles, the consolidation of their structure, and various budgetary measures, including subsidies for research and development of new types of computers, entailing liberalization, following the above policy line. The electronic computer industry circles have already made a request for assistance measures amounting to about 150 billion yen, as the State's budgetary measures (including financial investments and loans), accompanying liberalization. However, according to the talks between the two Ministries, there is a strong possibility that they will settle for around 80 billion yen.

The focal questions at U.S.-Japan trade negotiations had been mainly narrowed down to the Japanese side's huge surplus balance in its trade accounts with the U.S. and the Japanese side's non-liberalization of electronic computers. Therefore, it is now being observed in MITI circles that if U.S. approval can be obtained along the line of complete liberalization of electronic computers during 1975, "friction between the U.S. and Japan" will head toward dissolution, because there is also the situation of the imbalance in trade with the U.S., with a huge surplus on the Japanese side, is showing signs of moving rapidly toward improvement.

ITI Minister's Statement on Decision to Liberalize Electronic Computer and IC Imports; Pressure on Japan Expected to Lessen

At a press conference following the Cabinet meeting on the 15th, ITI Minister NAKASONE touched upon the liberalization of the imports of electronic computers, and said: "With the deciding of the liberalization of electronic computers, the biggest pending question in the trade field between the U.S. and Japan has been removed, and pressure against Japan will probably lessen." The gist of NAKASONE's statement was as follows.

Partly due to the fact that deliberations on the Trade Act Bill will start in the U.S., we decided to announce the liberalization of electronic computers quickly. In addition to there appearing signs of of the dissolving of the imbalance in the trade accounts between the U.S. and Japan recently, our deciding on the liberalization of electronic computers and IC's has removed the biggest pending problem in U.S.-Japan trade. With this, U.S. pressure against Japan trade. Witn this, U.S. pressure against Japan will probably lessen.

NIHON KEIZAI (Full)
Eve., June 15, 1973

IC Industry Circles Shocked; Caught Between U.S. Offensive and Liberalization

With the Cabinet decision on the 15th, imports of IC's will be liberalized during 1974. The industry circles concerned unanimously say "it is extremely regrettable" (Nippon Electric Standing Director HATTORI). Especially, even though domestic manufacturing firms have finally become able to enter into a structure for increasing production, due to the shortage of products in the U.S. and the increase in the domestic demand for IC's for portable electronic computers, they have been expecting that the shortage of products on the U.S. side would be overcome by 1974, and that it will be a year of excessive competition, and for this reason, the shock is great among the industry circles concerned, saying that "this is like being caught in a pincer, between liberalization and the offensive of American manufacturers."

NIHON KEIZAI (Full)
Eve., June 15, 1973

Import Liberalization of Computers to Take Place in 1975 and That of IC's Next Year

Cabinet Meeting Approves Plan Calling for Early Reorganization of Computer Industry and Expansion and Strengthening of JECC

At the Cabinet meeting held on the 15th, ITI Minister NAKASONE reported MITI's plan to "liberalize electronic computer imports in 1975 and IC (integrated circuit) imports at an opportune moment in 1974." This plan was approved by the Cabinet meeting. NAKASONE also reported that MITI wants to strengthen the computer industry at home in order to meet such liberalization, by taking the following steps: (1) to step up efforts for development of new kinds of electronic computers and improvement of the efficiency of IC's; (2) to strengthen the power of the soft-ware industry; (3) to enforce measures for dissemination of computers among medium and small enterprises; and (4) to strengthen and expand Japan Electronic Computer Co. (JECC). These measures, too, were approved by the Cabinet meeting. The budgetary appropriations for the enforcement of these measures are to be negotiated between the Finance Ministry and MITI before the compilation of the next fiscal year's budget is tarted.

The import and capital liberalization of electronic computers has been a pending problem between Japan and the US in the field of foreign trade. The Government has already decided, at a Cabinet meeting, to carry out capital liberalization by the end of 1975. Now, it has decided to enforce import liberalization, too, in 1975. This means that the problem of liberalization involving electronic computers has been brought to a final settlement. The Government is to convey its decision at once to the US side. It is expected that an agreement on computer liberalization will be reached between Japan and the US prior to the opening of the Joint Japan-US Committee on Trade and Economic Affairs which is scheduled for mid-July.

ITI Minister NAKASONE revealed that the import liberalization of computers and IC's will take place in 1975 and 1974, respectively. He also said, however, that "The liberalization may be carried out earlier, if possible." He expects that home industries concerned will understand his plan. It is expected, however, that the Government's decision on the date for total liberalization of computer imports will give a stimulus to the offensive of foreign capital, especially American capital, on Japan, making it necessary for Japanese industrial circles concerned to step up efforts for constitutional improvement.

NAKASONE says that a final agreement has not yet been reached between the Finance Ministry and MITI on the budgetary measures to be necessitated by the liberalization of computer imports. He has revealed, however, the countermeasures to be taken by MITI, such as the development of new kinds of electronic computers and the strengthening of the power of JECC. In the field of research and development, MITI will make positive efforts for development of new kinds of computers, and give assistance to the efforts for improvement of the efficiency of IC's. For constitutional improvement of the soft-ware industry, it want to lay special emphasis on the development of a soft-ware module, that is, the program constituting the unit of soft-ware as a whole, by stepping up the Government's assistance to the efforts in this field. On the other hand, MITI will take measures for dissemination of electronic computers among medium and small enterprises whose financial strength is not sufficient, and at the same time, step up efforts for constitutional improvement of JECC which is strongly demanded by industrial circles concerned. It wants to implement these concrete measures as early as possible, after consultations with the Finance Ministry about the related budgetary measures.

As for Japan-US relations, MITI thinks that the US side will be convinced by its liberalization plan, because the imbalance of Japan-US trade has been corrected speedily in the several past months. It expects that the trade friction between Japan and the US will be liquidated totally, except in such cases as agricultural products.

Three Groups of Computer Manufacturers to Exert All Efforts for Development of New Kinds of Computers and Make Preparations to Meet Another Reorganization

The Japanese manufacturers of electronic computers hold that its is most important for them, for the time being, to carry out the development of new kinds of computers which has been stepped up by the Fujitsu-Hitachi, Nichiden-Toshiba and Mitsubishi-Oki groups, in accordance with the Government's decision to liberalize computer imports "within 1975." They have confirmed again their established policy of promoting cooperation among the three groups.

They also think, however, it is unavoidable that the computer industry will be organized for a second time, in view of the fact that MITI has begun to exercise administrative guidance in the direction toward adjustment of relations among the different groups, on the strength of its subsidy for development of computers. They find it necessary to step up preparations to meet such reorganization.

The computer manufacturing firms think that MITI hereafter will take the following liberalization countermeasures: (1) to hasten to reorganize the enterprises manufacturing IC's and peripheral and terminal equipment and those in the field of software; and (2) promote cooperation among the three groups in the case of computers. They also think that MITI will follow, on the other hand, the policy of encouraging the firms to specialize in the specific kinds of computers in their efforts for development. According to this policy, Toshiba (Tokyo Shibaura Electric) may be asked to specialize in controlling apparatuses, Nichiden (Japan Electric) in data communication apparatuses, Oki (Oki Electric Industry) and Mitsubishi (Mitsubishi Electric Mfg.) in computers for scientific and technical purposes and small controlling apparatuses, and Hitachi and Fujitsu (Fuji Communication Apparatus) in portable electronic computers. The computer firms have become inclined to think that MITI may distribute its subsidy amounting to 80 billion, which is under negotiation between MITI and the Finance Ministry at present, on a priority basis in accordance with this policy.

On the other hand, the Foreign Capital Deliberation Council previously decided on the enforcement of 100 per cent capital liberalization by the end of 1975. Consequently, such American computer manufacturers as Digital Equipment Corporation and BURROUGHS are looking for a chance to start activity in Japan. It is expected that the decision on import liberalization, which has been made by the Government, will cause a sudden increase in large-scale computer imports from the firms run by foreign capital, such as CPC and Univac.

Sources concerned think that the share of the manufacturers backed by foreign capital in Japan's computer market, which is about 45 per cent at present, will increase to nearly 70 per cent. Japan IBM, which has already started a subsidiary firm in Japan solely with its own investments, is exerting all efforts for expansion of its market share.

While bitter competition is going on among computer manufactures for greater shares in the market, MITI has revealed, though unofficially, a plan to reorganize the indigenuous manufacturers into one group, and concrete countermeasures against the powerful IBM are becoming subjects of discussion. Consequently, it has become an important problem for the Government how to step up the preparations on the part of the manufacturers at home prior to the import liberalization scheduled to take place "within 1975."

NIHON KEIZAI
June 15, 1973
Page 6

IC Industry Reorganization Adjusting production Areas

In addition to the computer liberalization, IC liberalization is also being discussed. According to the MITI announcement of 14th, MITI has decided to start reorganization in IC industry. MITI's policy is: By targeting on 6 manufacturers out of 12 manufacturers which have strong sales systems, MITI will guide then to adjust their production areas for establishing the division of labor. However, IC manufacturers have made efforts at enforcing the international competitive power by aiming at the IC liberalization. Therefore, MITT's reorganization plan will bring about serious arguments.

Due to the strong request from the US for correcting the trade imbalance, the Government and Zaikai (business leaders society) are considering the IC liberalization as well. Therefore, IC industry is now ready to accept the situation that it cannot help but liberalize. The IC industry requests strongly its liberalizing time for April 1976, and as a liberalization countermeasure, 7 billion yen Aid for technology development.

The reasons why MITI has decided to reorganize the IC industry are 1) Japanese made IC production has just started. If we liberalize IC without doing anything, IC industry might be severely damaged by foreign companies; 2) Like the experiences of European countries by liberalization, leading manufacturers will start a serious export offensive in the Japanese market. There are possibilities of abolishing Japanese IC industry's growing chances; 3) IC is the basic technology of the electronics industry. Therefore, development of Japanese manufacturers is necessary, etc.

There are 12 IC manufacturers in Japan. But MITI has selected 6 manufacturers, such as Nichiden, Hitachi, Toshiba, etc which have strong sales. This is because as a liberalization countermeasure, IC development for its own company's computer system, is different from IC production for the industry. It is not suitable for the liberalization countermeasure. Therefore, MITI will divide IC into several groups such as MOS etc. Each company will become an expert of certain areas and divide the labor. Because of this, each area will have effective development as well as technology improvement. MITI intends to issue aid for liberalization countermeasure.

However, there is strong possibility for objections by the IC industry because IC is still at the developing stage. Each company does not want to abandon the development of its own products and concentrate only on one item for development. Reorganization policy will create a sensation in the IC industry along with other issues of computer liberalization and the final decision on the IC liberalization time.

NIHON KEIZAI (Full)
June 16, 1973

IC Industry Circles Desire Establishment of Legislative Measures by Government -- Prevention of Selling at Low Price

"Now that the situation has come this far, I hope that at least, liberalization will be postponed until the very end of 1974" (Japan Electric Managing Director Hideo HATTORI). In connection with the fact that the Cabinet has decided to fix that time for the import liberalization of IC's (integrated circuits) at "during 1974," voices, mixed with a sigh of grief, are rising from industrial circles concerned. The reason for this is that although at the very beginning, these industrial circles had desired "liberalization within three years," the "within two years" plan of MITI was decided, and that in the end, a final decision has been reached to carry out liberalization during next year.

MITI is taken the following optimistic stand which is entirely different from that, taken in the past: "Even if the time for liberalization is moved up, there are large or small gaps between the US and Japan, according to the field of IC's. When viewed as a whole, we do not think that confusion will arise." (Electronic Equipment and Appliance and Electric Machinery Division). MITI has hitherto thought that it would take two more years for the domestic manufacturers concerned to catch up with those of the US, and it had also even implied that the import liberalization of IC's would be postponed until after the capital liberalization thereof (December, 1974).

Industrial circles concerned are earnestly hoping for the early granting of subsidies, but they are steadily deepening their feeling of uneasiness as to the future situation, from the stand that "the in 1974 will become a very difficult situation" (Mitsubishi Electric Machinery Company Semi-Conductor Operation Department Chief Toshiya KASHIMOTO). This feeling of uneasiness is based on the sense of crisis that the export offensives by the U.S. side in 1970 and 1971. These offensives, which are said to have dealt a fatal blow to the industrial circles concerned, will be revived, riding on the crest of the waves of liberalization. Moreover, industrial circles concerned say, "We hope that consideration will be given to increasing the amount of subsidies and also to the enacting of an antidumping law" (Japan Electric Managing Director HATTORI). Thus, they are unlikely to withdraw immediately.

NIHON KOGYO (Full)
June 25, 1973

Three Electronic Computer Groups Strengthening Tie-up, Planning on Joint Development of IC's and Mutual Supply of Equipment

The three groups of home-producing electronic computers -- Hitachi-Fujitsu, Japan Electric-Toshiba, and Oki Electric-Mitsubishi Electric Machinery -- are showing conspicuous moves to strengthen their tie-up. This is due to the fact that the time for capital and import liberalization of electronic computers has come earlier than expected by the industrial circles, and that the offensives by various foreign-capital companies, such as IBM Japan, have become conspicuous. The Hitachi-Fujitsu group is working to strengthen its ties, deciding to receive orders jointly for large-size electronic computer systems, in addition to carrying out joint development of a new series of electronic computers. The Japan Electric-Toshiba group is also drawing up a plan to avoid double investments by jointly developing IC memories necessary for a new series and supplying them by sharing production between the two companies. In addition, the Oki-Mitsubishi group intends to solidify its co-operation structure as to mutual supply of parts and peripheral equipment, etc. It is expected that the co-operative relationship of each group will become increasingly strong in the future.

Will cope with Foreign Capital Offensives by Avoiding Double Investments

Our country's electronic computer industry circles were re-organized into three groups at the end of the year before last, under MITI guidance. The objective of the tie-up of each of these groups was to develop jointly a machine to counter IBM's 370 series.

The Hitachi-Fujitsu group is scheduled to produce a new series consisting of Type I (several times the model 165 of IBM 370), type II (equivalent to 165), Type III (equivalent to 155), and Type IV (equivalent to 145), with Hitachi taking care of Types II and III and Fujitsu Types I and IV. The two companies are supposed to share the production of basic soft, and peripheral and terminal equipment, too, but they are recently pushing joint development of IC's for electronic computers. As the time for import liberalization has been fixed at some time within 1975, they have launched forth not only upon jointly developing a new type of machine but also upon jointly receiving orders for a system combining in jointly receiving an order from the Metropolitan Komagome Hospital for an over-all medical treatment information system at the price of about ¥1.5 billion. As to large systems to compete with IBM's, the two companies are planning to expand their shares by setting up a system for jointly receiving orders.

The Japan Electric-Toshiba group will jointly develop a new series consisting of four types -- X-II, X-III, X-IV, and X-V -- taking charge of their respective, favorite fields, such as the central processing unit and the memory unit. They adopted this method with a view to avoiding their double investments. They are scheduled to develop jointly also IC memories to be used for the new series in large quantities, and work for mutual supply by sharing production.

In the case of the Oki-Mitsubishi group, on the other hand, the two companies established their tie-up relations earlier than the other two groups, and worked to strengthen their tie-up through joint development of a new series (consisting of three types). This group includes Japan UNIVAC and Oki UNIVAC, too, and Mitsubishi and Japan UNIVAC jointly developed the color character display unit. Thus, this group has been producing considerable achievements. It is planning to bring about greater tie-up results in the future, too, through mutual supply of parts, semi-manufactured products, and peripheral and terminal equpment.

SANKEI (Full)
August 14, 1973

MITI Informally Decides on Liberalization Countermeasures Expenses -- Electronic Computers: ¥43 Billion for Three Years: Aid to Be Extended for Development of New Models: Total Amount of subsidies to reach ¥77.1 Billion

In connection with the capital and import liberalization of electronic computers, MITI reached on August 13 an informal decision to secure liberalization countermeasures funds totalling 43,000,000,000 yen over a period of three years from fiscal 1975 and to use the funds, for example, for the purpose of fostering the development of new models by electronic computer industry circles at home. When MITI already decided on the 50-percent capital liberalization of electronic computers, it also decided to grant subsidies totalling 34,100,000,000 yen to electronic computer industry circles over a period of five years from fiscal 1972. With this, subsidies totalling 77,100,000,000 yen will be granted to electronic computer industry circles by the end of fiscal 1976.

When the Government decided on the fifth round of capital liberalization at around the end of April, it regarded electronic computers and other products concerned as "star items for liberalization." The aim of this plan was to prevent the worsening of U.S.-Japan economic relations. IN regard to the main units of electronic computers, the Government also decided to start liberalization from December, 1975.

Moreover, the Government decided to carry out 100-percent liberalization from December, 1974, with regard to IC's (integrated circuits), and from April, 1976, with regard to the soft-ware industry.

Furthermore, in regard to the liberalization of imports, too, the Government decided to start 100-percent liberalization during 1975, with regard to electronic computers, and in 1974, with regard to IC's.

In this connection, electronic computer industry circles at home have been asking for the granting of State subsidies totalling 147,500,000,000 yen, including the amount of funds for promoting the development of new model electronic computers, from the following stand: "These liberalization measures will deal a fatal blow to domestic manufacturers, which differ greatly in technical development power and sales power from IBM and other foreign capital-affiliated electronic computer enterprises."

In response to this, MITI held talks with the LDP Dietmen's League for Promotion of the Information Industry and the finance Ministry. As a result, it has recently been decided that subsidies totalling 43,000,000,000 yen or so will be granted.

The breakdown of the proposed subsidiaries is as follows: (1) Subsidies for promoting the development of electronic computers, etc.; (2) the strengthening of the sales setup as to home-produced electronic computers; (3) promotion of the technical development of IC's; (4) the promotion of technical development of the soft-ware industry; and (5) promotion of the mechanization of book-keeping at the commerce-industry associations and the Chambers of Commerce and Industry.

As regards the proposed promotion of the mechanization of book-keeping at the commerce-industry associations and the Chambers of commerce and Industry, it has been decided that efforts will be made to install home-produced electronic computers and terminal equipment in 90 places throughout the country, to expand the market for home-produced electronic computers, and to push modernization of the management of medium to small enterprises. In this connection, MITI Plans to use funds totalling 5,000,000,000 yen over a period of three years from fiscal 1974.

Moreover, in regard to strengthening the sales setup, MITI also plans to work strongly upon the Finance Ministry to use the Government investment and loan program funds from fiscal 1974 budget.

was destined to expand 2.7-fold from that of now five years hence.

The association is intending to incorporate its findings in a "computer white paper" which it plans to issue at the end of this month.

The salient points of its findings are:

In on-line operations

equipment.

As to expenses related to computers, the survey disclosed that system installation accounted for 56.2 per cent of the total expenses (down from the 56.1 per cent from the past survey); while personnel outlays ran to 26.8 cer cent (up from the 24.1 per cent in the past).

Hitachi, Fujitsu reach deal

Hitachi, Ltd. and Fujitsu, Ltd., two leading computer manufacturers, have agreed on joint development and manufacture of integrated circuits that will be usable for their computers.

Since the two companies nave been engaged in development of N Channel MOS ICs separately, they lan to divide their manuacturing process with repect to designing of circuits, tructure, degree of integraion and other areas.

Such ICs will be used in e main memory and logic rcuits of computers made the two companies.

Hitachi and Fujitsu so far ive been cooperating with ch other on a project to velop a new series of per large computers with ancial assistance from e Ministry of Internation- Trade & Industry. Their cision to collaborate in IC field also is expected tain to tighten their joint rking arrangement.

ccording to industry experts, the N-MOS memory has quicken the data processing speed of a computer per. Its use in the computer main memory thus will mean a major breakthrough in computer hardware technology.

Domestic computer companies have been rushing to develop N-MOS memories because International Business Machines Corp. of the US already uses such memories in its 370 Series.

As to progress of N-MOS memory development undertaken separately by the two companies, Hitachi only recently succeeded in developing manufacturing technology of an N-MOS memory having a 4,096 bit capacity.

Fujitsu also deevloped a similar memory having a 2,048 bit capacity and is planning to start using it in computers on an experimental basis.

TV venture

Matsushita Electric Industrial Co. is planning to produce household electric appliances, including color TV sets, in Spain to cope with the ban now imposed by the Spanish Government on imports of electronic products from Japan.

Matsushita announced recently that it had purchased Anglo Espana de Electrocita, a Barcelona-based electric appliance maker, to engage in the local production of color TV sets and other appliances.

The Spanish Government is banning the imports from Japan of electronic products in view of the current imbalance in Japan-Spain trade and to protect domestic industries.

A spokesman for Matsushita said that its products will be sold only within Spain for the time being.

wide shortage of ICs and their confidence in the competitiveners of domestic ICs against their foreign counterparts.

Mitsubishi plans first to raise prices of such logic circuit integrated circuits as transistor-transistor logic (TTL) whose profitability is particularly poor.

Mitsubishi Electric's ICs have been very sensitive to the market situation as the ratio of the firm's sales to outsiders has been relatively high, compared with that of the other 11 domestic IC makers.

As such, its present price raise move is being welcomed by others as an indication of the future trend.

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Fujikoshi turns to nev

Fujikoshi, Ltd. will shortly make a full-fledged advance into the field of making pollution preventing equipment with the technological cooperation three American and British makers of such equipment.

According to the bearing, tool and machine tool maker, it has agreed with Zurn Industries, Inc. and General Resources, Inc., both of the U.S. and Neckar Water Engineering Ltd. of Britain for importation of their advanced procezes of building anti-pollution equipment including dust collect garbage in contaminate ing facilities.

The techno troduced fro Zurn's meth its dust collec the "Ventury" a damper a and the "Cyc other inciner Resources' ma ing its bag f dust collector, processes of water-treating as the "Contra exchange devic tive sludge-a

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most firms owned both terminal equipment and main units. They constituted 88.4 per cent of those employing on-line operations.

On the other hand, the percentage of companies linking up their terminal equipment to the central computers of the Nippon Telegraph & Telephone Public Corp. was only 7.4.

Those resorting to on-line operations possess 32.4 special circuits per company, and this is expected to increase to 64 circuits in the next five years.

Use of public telecommunications circuits is due to increase to an average of 64.9 circuits per company five years hence, or higher than that for public circuits.

The survey disclosed that use of mini-computers particularly had increased.

It showed also that use of the batch system was increasing as compared to that for real-time in the phase of peripheral equipment.

As to expenses related to computers, the survey disclosed that system installation accounted for 55.2 per cent of the total expenses (down from the 56.1 per cent from the past survey), while personnel outlays ran to 26.8 per cent (up from the 26.1 per cent in the past).

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As to progress of N-MOS memory development undertaken separately by the two companies, Hitachi only recently succeeded in developing manufacturing technology of an N-MOS memory having a 4,096 bit capacity.

Fujitsu also deevloped a similar memory having a 2,048 bit capacity and is planning to start using it in computers on an experimental basis.

TV venture

Matsushita Electric Industrial Co. is planning to produce household electric appliances, including color TV sets, in Spain to cope

Mitsubishi plans raise of IC price

Mitsubishi Electric Corp. has reportedly begun negotiating with its customers on raising prices of its integrated circuits by an average of about 15 per cent.

The company is the first to take such a step in the integrated circuit industry here. It also is the first price raise step for IC since domestically-manufactured ICs were marketed seven years ago.

ICs are the only item among electronic components whose price has been tending to go down in the face of the aggressive sales drives by foreign IC makers in Japan.

Indications point that other IC makers will fall in line with Mitsubishi in the near future as such a price raise stems from the world-wide shortage of ICs and their confidence in the competitiveners of domestic ICs against their foreign counterparts.

Mitsubishi plans first to raise prices of such logic circuit ~~integrated~~ circuits as transistor-transistor logic (TTL) whose profitability is particularly poor.

Mitsubishi Electric's ICs have been very sensitive to the market situation as the ratio of the firm's sales to outsiders has been relatively high, compared with that of the other 11 domestic IC makers.

As such, its present price raise move is being welcomed by others as an indication of the future trend.

MACHINERY

Computer is requested for Latin America are

The United Nations Economic Commission for Latin America recently requested aid amounting to $2 million from Japan for buying a medium-size Japanese computer for its regional computer center, training personnel and other purposes, according to informants.

The request was said to be the first of its kind received by Japan for a computer hardware from developing nations on a governmental basis, although Japan has received requests for computer software from such nations as the Republic of Korea and Brazil.

They said the Japanese Government plans fully to meet the request as the project stands to improve the data-information setup of countries in this region.

The request was said to have listed the commissi
needs as:

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—A sum of $700,000
train 36 technologists
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—Facilities, including
air conditioning syst
worth $150,000.

The computer sought w
be one equivalent to t
IBM370-145 model.

The informants said t
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supporter nations, the U.
the Netherlands, France a
Britain, earlier rejected i
troducing an IBM comput
system with U.S. aid due
anti-U.S. sentiment amo
the Latin American natio

Fujikoshi turns to new field

Fujikoshi, Ltd. will shortly make a full-fledged advance into the field of making pollution preventing equipment with the technological cooperation three American and British makers of such equipment.

According to the bearing, tool and machine tool maker, it has agreed with Zurn Industries, Inc. and General Resources, Inc., both of the U.S. and Neckar Water Engineering Ltd of Britain for importation of their advanced processes of building anti-pollution equipment including
dust collectors, waste a
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The technologies to be i
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a damper and a collecto
and the "Cycloburner" an
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[illegible] in grams per kilometer, respectively at 0.30 and 0.25 for hydrocarbon, 2.7 and 2.1 for carbon monoxide and 1.6 and 1.2 for nitrogen oxides.

Compared with this, the new engine during its initial stage of running was said to have emitted in maximum value, only 0.14 to 0.17 of hydrocarbon, 1.58 to 1.82 carbon monoxide, and 0.88 to 1.05 of nitrogen oxides.

Even after continuous running equivalent to 60,000 kilometers, it still put out, at a maximum or only 0.15 to 0.17 of hydrocarbon, 1.7 to 1.81 of carbon monoxide and 0.87 to 0.97 of nitrogen oxides, Fuji said.

The company said such a remarkable performance stemmed from three technical innovations.

First, the air-fuel ratio in the "lean side" (one section of the cylinder where the fuel mixture is thinner than in the other section, rich side) is set at 1:15 or 16, a little thinner than the most easily combustible ratio of 1:14. A pre-heating type of intake manifold is used to step up fuel evaporation.

Thus, combustion inside the cylinder is made nearly complete to control generation of held down generation of nitrogen oxides. This was done by proper timing of ignition, careful selection of the cam specifications and proper modification of the compression ratio.

Third, the combustion gas temperature during the processes of expansion and exhaust strokes is maintained at the highest possible level to control the general of hydrocarbon and carbon monoxide. This was made possible by a newly-developed cylinder head as well as proper ignition timing and careful selection of the cam specifications.

[illegible] struction costs or in some cases to obtain an actually higher ship price.

As to such approaches, some shipowners have moved into negotiations with shipbuilders since the tanker market's sluggishness looks destined to become protracted.

They have expressed willingness to switch their deals to that for LPG carriers.

Ishikawajima-Harima Heavy Industries Co. recently began taking up a contract revision with National Bulk Carriers of the U.S. on four 446,500-deadweight ton tankers which the latter had signed up for.

In such a case, it was believed that pricing would undergo a change.

Nippon Yusen Kaisha and Sumitomo Shipbuilding & Machinery Co. recently reached agreement to alter NYK's purchasing of a 140,000-deadweight ton tanker for delivery in June, 1977 to a 120,000-deadweight ton ore-bulk carrier.

Jan
21,
75

It was understood that while the price of the tanker was set at about Y6.6 billion, the price of the ore-bulk carrier would come down to about Y6 billion.

Sumitomo also was reported to be in negotiations with Mostold Shipping of Norway to have it change its past order for 280,000-deadweight ton tanker to a bulk carrier of 120,000 deadweight tons.

On the other hand, Hitachi Shipbuilding & Engineering has managed to get Exxon Corp. of the U.S. which last year had ordered two 400,000-deadweight ton tanker, to change its buying to 500,000-ton versions.

While Exxon's price for the original contract ran to Y26.6 billion per ship, Hitachi succeeded in getting the price up to Y28 billion for each of the bigger tankers.

Exxon decided that it was more economical for it to use 500,000-ton tankers with the recent increase in operating costs.

Hitachi Shipbuilding & Engineering has induced Overseas Shipholding Group of the U.S. to alter its order last September for two 78,000-ton tankers to one LPG carrier of 3,000 cubic meter capacity.

√

RCA cuts C.MOS IC prices for Japan 20-30 per cent

RCA Corp., a major U.S. integrated circuit maker, has cut down prices of its complementary metal oxide semiconductor (C.MOS) integrated circuits for digital circuits it exports to Japan via Okura Trading Co., its Japanese import-sales agent.

Its price cuts, as big as 20 to 30 per cent, appear certain to lead other U.S. C. MOS IC makers, such as Motorola, Inc. and Solid State Scientific Devices Corp., to follow suit. This is because RCA is regarded as the "price leader" for such products in Japan.

Since Japan launched full IC decontrol last year-end, the U.S. IC makers' price cut race has been surfacing, and this has placed Japanese IC makers in a quandary.

According to Okura Trading, RCA's current price slash covers all of the 94 types of its C.MOS integrated circuits for digital circuits.

It also pointed out that mass production has enabled RCA to shear prices its ICs by such a large margin.

It said the cumulative output of C. MOS ICs RCA began manufacturing in 1968 will surpass 100 million units within this year.

TRACTOR SALES TO N. VIETNAM IS PLANNED

Kubota, Ltd. plans sending a mission to North Vietnam this spring to have it negotiate on export of tractors.

As the company already has received inquiries for tractors from North Vietnam, it is going actively to propel such exports to the country from now.

Such inquiries seems to be for types and prices of Kubota's tractors, possibly medium-types of about 20 HP.

Many Japanese industry circles, such as farming machine, fertilizer, mining and steel, up to now have received inquiries for their products form North Vietnam in relation to the country's economic rehabilitation program.

North Vietnam has made inquiries for tractors with Kubota as it recognizes Kubota as Japan's top farming machine maker.

Kubota feels that its exports of combines, rice-planting machines and diesel engines for agriculture to the country will be promising depending on its forthcoming negotiations on tractor exports.

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substitute in case the present project among Japanese, American and Italian aircraft and airline interests to produce a new jet transport plane for Japan—the YX—bogs down.

Plate plant for USSR

Nichimen Co. has secured an order from the Soviet Union for an integrated plant for turning out large steel plates for shipbuilding use.

The trader said that the order is worth about Y1.5 billion.

The deal was said to be the first for exporting an integrated plant related to shipbuilding to the Soviet Union, although the Russians up to this time have bought separate machinery items.

ILC is planning to undertake lease of computers made by Control Data

International Leasing Corp., Tokyo-based affiliate of Nippon Shimpan Co. is going shortly to revise its articles of association to enable it to undertake leasing of computers, chiefly those of Control Data Corp. of the U.S.

ILC, set up jointly by Nippon Shimpan and Commercial Credit Co. of the U.S. last June, has been dealing with industrial machines.

It has decided to lease computers of Control Data as Commercial Credit Co., its stockholder, is an affiliate of Control Data.

This is the first instance of a Japanese leasing firm dealing with CDC's computers.

This also is taken as a significant step of Control Data which eyes consolidating its sales foothold via leasing firms called the "third" networks for computer sales in Japan, in relation to slated full decontro of computer import at the end o this year.

Philippines will get tanker, 2 carriers

Okura Trading Co. is going to deliver an 85,000-dwt tanker and two 6,000-dwt timber carriers, worth a total of about Y10 billion (approx. $3 million) to the Philippines.

The tanker is slated to be delivered to the Philippine National Oil Co. by this March.

The two timber carriers will be purchased jointly by a group of Filipino enterprises, including banks and lumber making firms, and they will be used to carry philippine lumber to Japan.

NIHON KEIZAI
November 5, 1973

IC INDUSTRY LOOK TO THE GOVERNMENT FOR AID IS IT QUICK REMEDY OR ONLY NARROW ESCAPE

Regarding the import liberalization for the computer which the US has urged upon Japan, the Government has decided to liberalize IC goods one year earlier than computer liberalization. In exchange for the liberalization, the IC industry has requested that MITI raise 7 billion yen aid. Dicussions between MITI and MOF, might lead to the conclusion of 35-billion-yen aid package for mass-production of new manufacturings. Foreign companies are very calm about the idea that a company which needs aid will not survive. (Japan Texas Instruments) Anyway, a 35-billion-yen aid package which has almost been concluded, will either be a quick remedy for the competitive power or only a narrow escape for delaying the end of the competition--It is a very crucial period for the IC industry.

Crowded around the 35-billion-yen Aid

Twelve Japanese IC manufacturers are mostly home appliance companies or telecommunication manufacturers. Even though Dr. Liona Ezaki received the Nobel Prize by discovering the Diode, Japanese semiconductor industry depends on the America technology and the introduction of US know-how in production. Regarding the technical difference between the US and Japan, there is almost 2-year delay in IC development.

Then, the "Liberalization Countermeasure" aid has arisen; the objectives are 1) IC which has similar ability as the computer, 2) IC for industrial use, such as telecommunication system, 3) IC for high-speed memory, and 4) IC for watch/automobile use. Objectives are one which can reduce the big technical differences with the US or one which has not been developed successfully in the world. Funding rate will be 45%: It means that the Government will take care of almost half of finances for facilities for mass-production of new products which have big risk. It is just like a dream story for a fallen industry.

These 4 themes are selected after discussions between MITI and manufacturers. Hitachi, Nichiden, Toshiba and Mitsubishi feel that these themes have been decided exactly as they suggested. Moreover, Fujitsu, etc. have entreated to get a spot to join the project. According to official talks, time to settle the grant will be when the budget allocation including the Aid has been concluded. However, by taking the grant as a premise, each company has started to order a new facility for mass-production and is preparing to introduce it.

The four unofficially notified companies (?) are all leading electric home appliance companies. Therefore, 7/8 billion yen aid for each company, can be handled with its profits. However, the IC area has been marked with red-figures for all companies through competition with the US. IC division is, in a sense, the division of burden in the company. Because of the division system with a self-supporting structure as its basic principal, the semiconductor division's power in the company is very weak. Therefore, the aid is very much welcome.

Big difference from 6 months ago

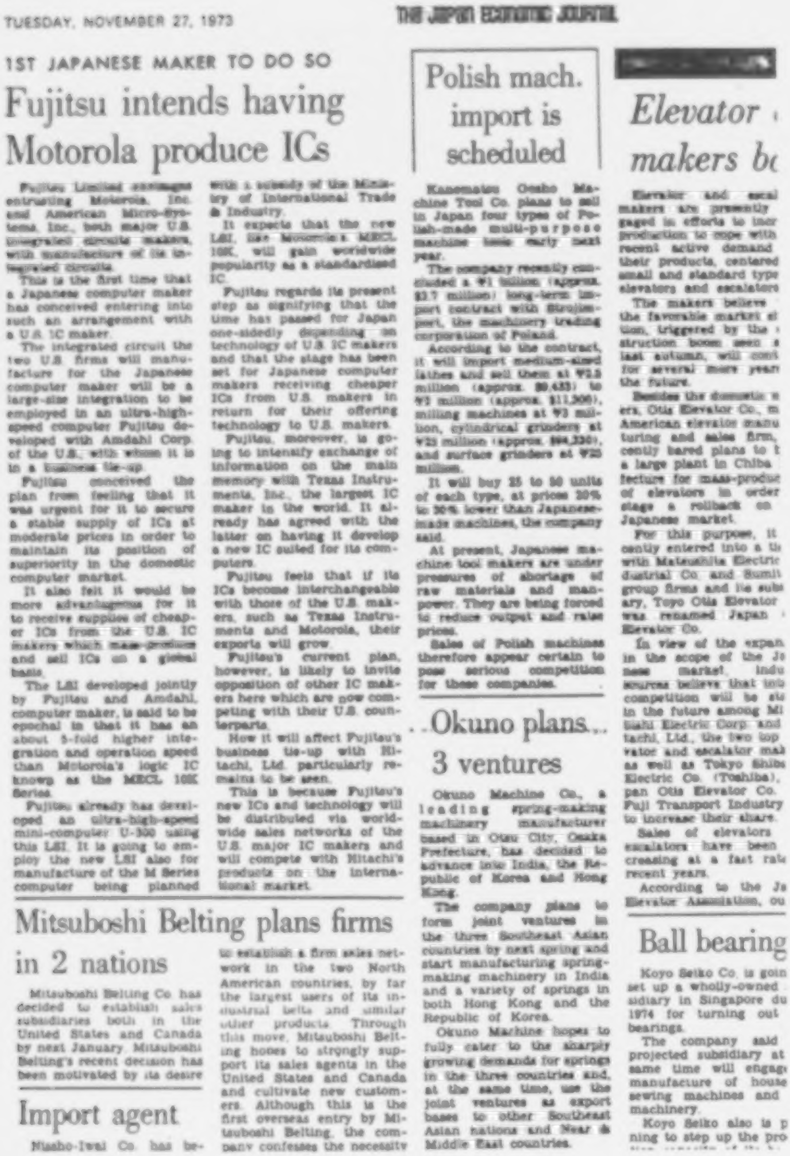
In 1971, the SSI which had already liberalized imports, experienced serious damages from US manufacturers, such as Texas Instruments, etc. There are several manufacturers who have not repaid the manufacturing facility. On the other hand, due to government decisions of import restrictions, some companies, such as Hitachi, have improved their LSI for the electric calculator, and reached a level as one of the three leading companies in the world, such as Hitachi. And the same companies start to show a strong attitude that our products are equal to the US products in technology as well as cost. We are very confident to be second to none. (Nichiden) There is a big difference from 6 months ago when the industry presented a petition to the Government: Granting aid does not prevent the US offense. We request Urgent Import Restrictions.

US industry starts low-price offense

IC production this year showed 40-50% increase over the previous FY. The IC industry becomes active. But, lack of goods are very serious. Companies stocks are always empty even though it increases production. FY 1973 will be the first year for the industry to reach the 100 billion yen market. The argument of reorganization has been forgotten.

However, the opinion that this good period will not continue more than one year, is still strong. Like endorsing the uncertainty, IC imports have increased rapidly. According to statistics of Customs done by MITI, the actual result of imports have increased rapidly from May, and the total import during the period of January through August, was more than double that of the previous FY for same period. The cost has been reduced widely: 425 yen per unit in 1972, 285 yen per unit in 1973. The low price offense carried out by the US which has worldwide market share, has been strong. The Big Three in IC, Texas Instrument, Motorola and Fairchild, urge the establishment of an integrated production system in Japan.

Moreover, the area which Japanese manufacturers try to develop by Aid, are attractive to other US manufacturers, too, to advance into Japan. Even though Hitachi which has the biggest share in the industry, shows its uneasiness towards US low-cost offense strategy: This good period is due to demands for electric calculators. If it stops, ... In short, Japanese manufacturers feel an uncertainty for the future despite activity now. Therefore, the industry will rely heavily on aid even though it is small.



TUESDAY, NOVEMBER 27, 1973

THE JAPAN ECONOMIC JOURNAL

1ST JAPANESE MAKER TO DO SO

Fujitsu intends having Motorola produce ICs

Fujitsu Limited envisages entrusting Motorola, Inc. and American Micro-Systems, Inc., both major U.S. integrated circuits makers, with manufacture of its integrated circuits.

This is the first time that a Japanese computer maker has conceived entering into such an arrangement with a U.S. IC maker.

The integrated circuit the two U.S. firms will manufacture for the Japanese computer maker will be a large-size integration to be employed in an ultra-high-speed computer Fujitsu developed with Amdahl Corp. of the U.S., with whom it is in a business tie-up.

Fujitsu conceived the plan from feeling that it was urgent for it to secure a stable supply of ICs at moderate prices in order to maintain its position of superiority in the domestic computer market.

It also felt it would be more advantageous for it to receive supplies of cheaper ICs from the U.S. IC makers which mass-produce and sell ICs on a global basis.

The LSI developed jointly by Fujitsu and Amdahl, computer maker, is said to be epochal in that it has an about 5-fold higher integration and operation speed than Motorola's logic IC known as the MECL 10K Series.

Fujitsu already has developed an ultra-high-speed mini-computer U-300 using this LSI. It is going to employ the new LSI also for manufacture of the M Series computer being planned with a subsidy of the Ministry of International Trade & Industry.

It expects that the new LSI, like Motorola's MECL 10K, will gain worldwide popularity as a standardized IC.

Fujitsu regards its present step as signifying that the time has passed for Japan one-sidedly depending on technology of U.S. IC makers and that the stage has been set for Japanese computer makers receiving cheaper ICs from U.S. makers in return for their offering technology to U.S. makers.

Fujitsu, moreover, is going to intensify exchange of information on the main memory with Texas Instruments, Inc., the largest IC maker in the world. It already has agreed with the latter on having it develop a new IC suited for its computers.

Fujitsu feels that if its ICs become interchangeable with those of the U.S. makers, such as Texas Instruments and Motorola, their exports will grow.

Fujitsu's current plan, however, is likely to invite opposition of other IC makers here which are now competing with their U.S. counterparts.

How it will affect Fujitsu's business tie-up with Hitachi, Ltd. particularly remains to be seen.

This is because Fujitsu's new ICs and technology will be distributed via worldwide sales networks of the U.S. major IC makers and will compete with Hitachi's products on the international market.

Mitsuboshi Belting plans firms in 2 nations

Mitsuboshi Belting Co. has decided to establish sales subsidiaries both in the United States and Canada by next January. Mitsuboshi Belting's recent decision has been motivated by its desire to establish a firm sales network in the two North American countries, by far the largest users of its industrial belts and similar other products. Through this move, Mitsuboshi Belting hopes to strongly support its sales agents in the United States and Canada and cultivate new customers. Although this is the first overseas entry by Mitsuboshi Belting, the company confesses the necessity

Import agent

Nissho-Iwai Co. has be-

Polish mach. import is scheduled

Kanematsu Gosho Machine Tool Co. plans to sell in Japan four types of Polish-made multi-purpose machine tools early next year.

The company recently concluded a ¥1 billion (approx. $3.7 million) long-term import contract with Strojimport, the machinery trading corporation of Poland.

According to the contract, it will import medium-sized lathes and sell them at ¥2.5 million (approx. $9,433) to ¥3 million (approx. $11,300), milling machines at ¥3 million, cylindrical grinders at ¥25 million (approx. $94,330), and surface grinders at ¥25 million.

It will buy 25 to 50 units of each type, at prices 20% to 30% lower than Japanese-made machines, the company said.

At present, Japanese machine tool makers are under pressures of shortage of raw materials and manpower. They are being forced to reduce output and raise prices.

Sales of Polish machines therefore appear certain to pose serious competition for these companies.

Okuno plans 3 ventures

Okuno Machine Co., a leading spring-making machinery manufacturer based in Otsu City, Osaka Prefecture, has decided to advance into India, the Republic of Korea and Hong Kong.

The company plans to form joint ventures in the three Southeast Asian countries by next spring and start manufacturing spring-making machinery in India and a variety of springs in both Hong Kong and the Republic of Korea.

Okuno Machine hopes to fully cater to the sharply growing demands for springs in the three countries and, at the same time, use the joint ventures as export bases to other Southeast Asian nations and Near & Middle East countries.

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elevators and escalators.
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the favorable market si
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struction boom seen
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Besides the domestic m
ers, Otis Elevator Co., m
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of elevators in order
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pan Otis Elevator Co.
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to increase their share.
Sales of elevators
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According to the Ja
Elevator Association, ou

Ball bearing

Koyo Seiko Co. is goin
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The company said
projected subsidiary at
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sewing machines and
machinery.
Koyo Seiko also is p
ning to step up the pro

KNHON KOGYO (Full)
November 29, 1973

IC Subsidies to Be Granted to 8 Companies; Mitsubishi-Oki and Fujitsu-Sharp-Kyodo Electronic Groups Come to Fore; Hitachi, Toshiba, and Japan Electric to Carry Out Unilateral Development

In connection with subsidies for the promotion of technical development, for the granting of which subsidies IC (integrated circuit) industry circles have been strongly asking the Government, as a part of their liberalization countermeasurers, 1,700,000,000 yen has been appropriated in the supplementary budget for fiscal 1973, and these industrial circles are waiting for the Supplementary Budget bill to pass the Diet. In this connection, MITI clarified the following basic policy as to the granting of subsidies, on Nov. 28: (1) The five points, that is siliconegates, N channel MOS's (metal membrane oxide semi-conductors), C-MOS's (complementary metal membrane oxide semi-conductors), highly-advanced linear IC's for industrial use, and liner IC's for industrial use will be regarded as themes for development, as already planned; and (2) in regard to the N channel and linear IC's for industrial use, efforts will be made to take the form of sharing the task of development between or among two or three companies concerned. Therefore, the companies concerning the two themes will be classified into groups, and eight of the 12 home-produced IC manufacturing companies will be regarded as object companies for the granting of subsidies. Thus, the framework will be expanded.

With regard to the Government's financial subsidies for carrying out liberalization countermeasures toward IC industry circles, in which capital liberalization will be carried out from December, next year, and import liberalization will start "at an appropriate time during next year," a total of 3,500,000,000 to 4,000,000,000 yen is expected to be granted in fiscal 1973 and 1974. In this connection, it has recently been decided that for the present, 1,700,000,000 yen as the amount of subsidies for this fiscal year will be granted in the supplementary budget. At the next regular Diet session, which will convene in December, deliberations will be conducted on the Supplementary Budget bill. The prospects are that if Diet deliberations progress smoothly, then the said bill will pass the Diet by around the middle of December. MITI says that as soon as the bill passes the Diet, applications will be accepted from various manufacturers concerned, with regard to each theme, and that such subsidies can be granted by around the middle of next January, after administrative procedures, including screening, are taken.

The five items, that is, siliconegates, N channel MOS's, C-MOS's, highly-advanced linear IC's for industrial use, and linear IC's for industrial use, will be regarded as themes for development, as already planned. Especially in regard to two of these themes, that is, the N channel and linear IC's for industrial use, MITI plans to form a joint development group composed of two N channel companies and three industrial-use linear IC companies. Therefore, eight of the 12 home-produced IC manufacturers, that is, three companies for unilateral development and five companies for group development, will become object companies for the granting of subsidies.

In this connection, it is generally certain that in industrial circles concerned, Hitachi will introduce itself as a candidate company for the development of siliconegates, Toshiba for C-MOS's, and Japan Electric Machinery-Oki Electric Industry group will be established as to N channel, and a Fujitsu-Sharp-Kyodo electronic technical Research Institue group as to linear IC's for industrial use.

It is also thought that the formation of such groups may cause the reorganization of IC industry circles. Therefore, attention is being paid to the moves of various companies concerned, with regard to the lodging of applications.

NIHON KEIZAI
January 6, 1974

JOINT DEVELOPMENT FOR IC NEW MODEL BECOMES ACTIVE
Mistubishi - Oki; Fujitsu - Sharp, etc.

By taking grants from MITI's Liberalization Countermeasure Aid, the IC industry which will liberalize imports in 1974, has became active in reorganization of the industry. They will try to develop a new product by the Joint Development system, and will also try to share in production stage:

Joint Development Groups are: Mitsubishi and Oki to develop N-channel MOS-IC; Fujitsu, Sharp and Joint Electronics Technology development Research Institution to develop linear-IC for industrial use.

Each group has applied for aid amounting to a MITI grant of 3.5 billion in 1973 and 1974, to develop the new technology. It is expected to be granted, on the same principle as Hitachi--Sylicon Gate MOS, Toshiba--C-MOS, Nichiden--High speed linear-IC.

Mitsubishi-Oki group will introduce new production facilities for the development and will cooperate to produce the N-channel MOS-IC. Moreover, Mitsubishi-Oki will tie up business and sales, and they are planning to put their joint products as a common series of products. Both companies will cooperate to develop the new computer system; they will cooperate to develop in the IC area, too. Therefore, their cooperation system will become stronger.

On the other hand, the Fujitsu-group does not have any system of cooperation: only the Joint Electronics Technology research Institution has had business with both companies, as IC specialists. High speed linear IC has closed relations with telecommunication technology. Fujitsu, which is the leading telecommunication manufacturer, tried to advance into the high-speed linear IC area, but, it has not had any experience in IC sales. Therefore, the Joint Electronics Technology Research Institution which has 100% sales in business, was selected to cooperate with Fujitsu.

Due to the severe competition with the US through import liberalization, the Japanese IC industry is expected to be combined into small groups 12 companies. Because of MITI's Countermeasure Aid, each company will develop certain areas of IC. Major IC areas such as Bipolar Digital IC, etc. which the U.S. manufacturers have strong confidence in are left out from the objective items of aid. Therefore, competition between domestic companies and foreign companies are admitted.

Therefore, combining into small groups is an opportunity for the reorganization of the industry, but there are many obstacles for the future, such as strengthening of the industry's unity.

NIHON KEIZAI (Full)
January 24, 1974

Electronic Computer Industry Circles Heading toward Further Reorganization to Build Setup to Intercept IBM, in Preparation for Impending Liberalization: Cooperation in Sales Field Their Task

Three groups, consisting of six domestic computer manufacturing companies, have begun to move toward strengthening their respective intra-group cooperation one after another. In other words, including IBM, in preparation for the impending liberalization. These groups firmly established cooperation formulas in the fields of production and sales, which had been left ambiguous even after their inauguration, on the one hand, while on the other, expanded the scope of cooperation to all business operations, including maintenance services. The intra-group cooperation is a major premise for the realization of further reorganization of the industry circles, the necessity of which has been emphasized for some time past. It has become highly probable that with the realization of cooperation, the time scheduled for this further reorganization will be quickened at one shot, with this as an opportunity.

The reason that the three groups have rapidly decided at this time on concrete strategy in such fields as production and sales is that basically, the deadline for the liberalization schedule has approached. Import liberalization is scheduled to be effected in succession, with capital liberalized 50 percent in August this year and 100 percent by the end of next year. In business talks on large size machines, Japan U.S. competition has already started in anticipation of liberalization. Moreover, IBM has been waging offensives since last year. The IBM 370 series, fitted with virtual memories, are sweeping over the markets. It is necessary for the groups to clarify their measures to cope with IBM within fiscal 1973, with the subsidized computers as the axis, even for the purpose of making them consistent with MITI's subsidy administration.

In this environment, the three groups of domestic computer manufacturers have become compelled to move forward from the "mixed structure" to a "unified structure," by stepping up the development of subsidized computers, completing trial manufacture successively, working for the sharing and unification of production and partially adopting the joint sales system in the field of sales, too, which has so far been an area of mutual non-aggression.

However, there are also some problems to be settled before this intra-group cooperation is strengthened on a full scale. Take the sharing of production as an example. Even if allotted production is decided upon definitely in such a way that small size machines are to be undertaken by one group and line printers by another, it is fully conceivable that each group will prepare for the production of the same types of machines as another's, "supposing cases of trouble on the part of the other group." It is also possible for them to produce independently different machines in the same class as those jointly developed and compete with one another. As to the unification of brands, too, it seems safe to consider that if this is to be limited to machines for which they receive orders jointly, computers appearing on the market will vary among the six companies.

Also as to the problem of cooperation in the field of sales, the fact is that severe competition is being developed whether in the groups or otherwise, with computers delivered by Fujitsu, being replaced by those delivered to Hitachi, for example, or vice versa. It will be very difficult to sell them jointly after tomorrow, partly because of the difference in the enterprise constitution. The distribution of profits from joint sales is a problem, too.

In spite of these difficulties, however, we must make much of the fact that they have started on the line of strengthening intra-group cooperation. After the formation of groups in 1971, they started joint development of computers proper, moved forward to joint production, including peripheral, terminal machines, and have also taken the posture of joint sales of some machines this time. This means that they have expanded the scope of their cooperation as to general business activities, although there is some difference in the degree of cooperation in each sector. It has now become actually impossible for two companies in one group to separate from each other because of the egoism of either of them. Thus, intra-group cooperation will become closer. In the event of separation, this will mean withdrawal. In this sense, it can be said that they have been completely unified as a group.

Of course, the fact that the three groups have begun to move on a large scale is due to their respective circumstances, for the Japan Electric-Toshiba group, which announced the establishment of a joint venture on the 23rd, it is necessary to recover the initiative which has been consistently held by the Fujitsu-Hitachi group since the formation of the three groups. Especially Japan Electric, which is aiming at recovering lost territory, is staking its fate on the jointly developed machine, and it has no other way but to take the first move and win at all costs. The Fujitsu-Hitachi group should take this opportunity to launch forth on the solidification of its sales structure through top-level talks, even in the sense of showing the posture of always leading the industry circles. The Oki-Mitsubishi group probably wants to make it known that it is producing the biggest effect of cooperation, although it is less powerful. The subsidies, which the various companies are receiving from MITI in accordance with the consensus calling for "fostering the domestic computer industry," are approaching the final fiscal year; it may also be necessary for them to publicize to the Government and the people their achievements to date and future structures.

Although such expectations of the various companies are entangled with one another, however, the undercurrent of the industrial circles is moving forward toward a big structural change and further reorganization, after all. Since no one can see any safety zone for "domestic computers where they will be completely safe," it can be said that the computer industry circles cannot but aim at further reorganization by themselves. The anti-IBM operations, including the establishment of joint ventures in Europe, are also because of the circumstances where they could not but be established; in spite of the fact that these operations contained the speculations of manufacturers of various countries.

MITI formulates steps for 'countering' IBM

JKS JAN 29, 74

The Ministry of International Trade & Industry is going to set aside ¥[illegible] million (approx. $65 million) for promotion of the computer industry in fiscal 1974.

This was revealed in the appropriation related to information processing for fiscal 1974 the Ministry compiled on the basis of the Government draft national budget for fiscal 1974.

The outlay for promotion of the computer industry for fiscal 1974, the mainstay item in MITI's information-related budget, is up about 10.7% over the like budget for the preceding year at ¥17,743 million (approx. $59 million).

It breaks down into ¥15,250 million (approx. $50 million) for fostering development of new types of computer proper, ¥1,400 million (approx. $4.7 million) for development of computer peripherals, ¥5 million (approx. $17,000) for clerical expenses, ¥1,800 million (approx. $6 million) for development of integrated circuits and ¥1,300 million (approx. $4 million) for development of software.

Computer industry circles regard the budget as favorable to them in view of the fact that the Government is expected substantially to tighten the national budget for fiscal 1974.

Quarters concerned hold the view that the budget [illegible] strong character of [illegible] aimed at fostering the domestic computer industry to compete against IBM for coping with import and capital decontrol of computers slated for late in 1975.

Also included in MITI's information related appropriation are a subsidy of ¥[illegible] million (approx. $3.3 million) earmarked for the semi-governmental Information Technology Promotion Agency (ITPA) and a subsidy of ¥700 million (approx. $2.3 million) for Japan Electronic Computer Co (JECC).

The subsidy for ITPA is for development of advanced universal purpose computer programs on a consignment basis, buying and leasing of such programs and research on pattern information systems, while that for JECC is for buying second-hand computers from domestic computer makers, and employing them to streamline booking and accounting operations of small firms.

As to the Treasury investments for promotion of domestic computer technology, MITI has decided to almost double the framework of the Japan Development Bank's lendings to computer makers to ¥22,500 million (approx. $75 million) in fiscal 1974 from the preceding year's ¥11,500 million, and apply a special interest rate of 7.5% for JDB's lendings.

Sharp plan making solar equipment

Sharp Corp. intends to start commercial production of [illegible] communication equipment, desktop electronic calculators, clocks and other products using solar batteries before the end of the year if development of [illegible] batteries makes progress, the company's president, Akira Saeki told a recent news conference.

Saeki said his company was tackling development of solar batteries from the aspects of both finding applications for the batteries and cutting down their production cost.

With the present manufacturing method, solar batteries are 300 times as costly as electricity as a power source, Saeki said. Thus, Sharp has created a task force for reducing the production cost to one-third the present level mainly through use of less costly and more efficient materials, according to the president.

Yamada-Shomei reaches agreem't with Emerson

Yamada Shomei Lighting Co., well known producer of [illegible] illumination equipment, revealed recently that it reached a technological tie-up with Emerson Electric Co. of the U.S. in the field of lighting.

It constitutes the first case of Yamada Shomei advancing into the sector of fluorescent lighting equipment.

With technology from Emerson, Yamada-Shomei plans to produce such lighting fixtures shortly for undertaking sales from April.

With regard to Yamada-Shomei's announcement, industry quarters noted that large foreign makers of lighting equipment have been rushing to advance into the Japanese market in the past few years.

They cited that Sylvania and General Electric, both of the U.S., have set up joint illumination-lighting fixtures ventures respectively with Nippon Electric and Iwasaki Electric, and West German and British makers also have reached technical tie-ups with Japanese interests.

Shortly before Yamada-Shomei's disclosure, Lighting Corporation of America set up its Far East office in Tokyo and since then is said to have embarked on an investigation of the Japanese market.

While Japanese lighting firms have developed high quality light sources of their own, they lag behind Western makers in technology for producing fixtures.

They thus have begun [illegible] ing such technology and foreign capital for boosting their competitiveness.

As for foreign makers, they have moved to reach tie-ups from recognition that Japan is an attractive market and their desire to use Japan as a foothold for expanding their business in Asia.

Munich firm

Riken Electric Machinery Co., a specialized manufacturer of analytical instruments, has decided to set up a subsidiary in Munich under the name of Riken Deutschland in March.

The company has made this decision for streamlining its sales network in Europe.

It also plans to incorporate Riken U.S.A., its another branch in New York, in May.

Reserves

(Continued from Page 3)

maintained so that the yen may not take the initiative in an international devaluation race.

Efforts will be exerted, however, for preventing the dwindling reserves to dip below the $10,000 million level for [illegible]

EPA REPORT FOR JANUARY

The full-scale surfacing of the impact of the crude oil supply slash by Arab oil producing countries required strong caution as it has begun to retard economic growth in major countries and offer a fresh spur to the soaring of prices.

This was stressed by the Economic Planning Agency in its [illegible]

DEMAND CURB TAKES EFFECT

ago, indicating a slowing down in the qualitative rise.

In the balance of payments in November, the trade balance registered a surplus of $550 million on the strength of a sizable gain in exports.

The current balance also stood in the black [illegible]

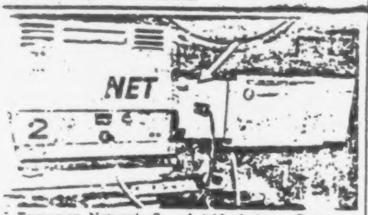
seasonally adjusted, after a gain of 3.5% in October. Exclusive of ships, however, November shipments dipped by 9.9% from a month ago.

Inventories in the mining-manufacturing sector, which surged by 1.0% in October from the previous month, rose by 0.4% in November, [illegible]

17.0% over a year ago.

Money: The Treasury's accounts with the public in December registered an excess of receipts over payments amounting to ¥235,300 million (approx. $784.3 million) mainly due to a sizable receipt excess of ¥280,900 million [illegible]

the computer to which it is linked informs the op-
or of the error and enables correction, according to Fu-
. Price has yet to be decided.



Television Network Co. of 4-10, 6-chome Roppongi,
to-ku, Tokyo has developed a device which enables easi-
tating, reversing, splitting up and combining color tele-
on images. It requires no changes of the TV camera. The
e is simply inserted between the camera and lenses, the
oper says. The equipment is one-third the size of an
nary zoom lens for color TV use and weighs 10 kg.

mputer—

ontinued from Page 1)

puter versions capable competing against IBM governmental research-elopment subsidies as puter imports and direct investments into the puter field is going to be ved from the end of

Fujitsu-Hitachi and -Toshiba groups were to announce their new ls, respectively the M and X Series, in April y and place them on market by the end of year

Mitsubishi-Oki group ds to use common names and series rs, such as for their OKITAC and MELCOM.

The NEC-Toshiba group is eyeing forming a new joint company as an adjustment organ for their production and sales programs.

Under such a plan, Toshiba is expected to produce big computers and mini-computers and NEC, small and medium versions.

They intend to go into full-fledged production sharing as to magnetic discs, magnetic tapes and peripheral and terminal equipment.

Other steps planned are 1) dividing up territories for repair and maintenance, 2) rearranging their software-related firms more efficiently and 3) consolidating training of computer personnel.

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the company said.

Its most outstanding feature was said to be its [illegible] for a period of at least two months under normal room temperature if kept sealed up in a shade.

Tests as to its resistance to impact and adhesiveness reportedly have shown it is far better than conventional adhesives of volatile solvent, heat-reacting and heat-fusing types.

It is applicable to such transparent substances as glass, metacrylic resin and

Co. of Osaka.

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prox. $2.9 million [illegible]
$166,000) in six months [illegible]
March 1973.

Chivoda sells smoke. water technologies

Chiyoda Chemical Engineering & Construction Co. will shortly export its smoke-desulfurizing technology to a major West German company and also its continuous activated carbon water treatment technology to a leading Italian firm.

It said it has reached basic export agreements with Heinrich Koppers GmbH of West Germany and Anic S.p.A., an affiliate of Ente Nazionale Idocarburi (ENI) of Italy.

Chiyoda's two processes will be exported to West Europe for the first time although the smoke desulfurizing process has [illegible] been exported to the U.S.

Most Japanese [illegible] firms requiring or producing pollution-control equipment are still heavily dependent on imports of technologies from advanced Western [illegible]tions.

According to Chiyoda, smoke desulfurizing process called the Chiyoda Th[illegible] [illegible] [illegible] [illegible] is expected [illegible] Koppers for production [illegible] sales of smoke [illegible] and system to [illegible] electric power station.

The process removes su[illegible] [illegible]

JET
Jan 29, 74

TUESDAY, JANUARY 29, 1974 THE JAPAN ECONOMIC JOURNAL

IN FY 1974 BUDGETARY PROGRAM

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Saeki said his company was tackling development of solar batteries from the aspects of both finding applications for the batteries and cutting down their production cost.

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Reserves—

(Continued from Page 3)

maintained so that the yen may not take the initiative in an international devaluation race.

—Efforts will be exerted, however, for preventing the exchange reserves to dip below the $10,000 million level for preventing overseas repercussions and adverse effects on the domestic exchange market.

In a related move, the Finance Ministry late last week also decided to take the following steps early in February:

—Switch the long-term financing source Japanese airlines get in buying air-

EPA REPORT FOR JANUARY

DEMAND CURB TAKES

The full-scale surfacing of the impact of the crude oil supply slash by Arab oil producing countries requires strong caution as it has begun to retard economic growth in major countries and offer a fresh spur to the soaring of prices.

This was stressed by the Economic Planning Agency in its monthly economic report for January released last week.

EPA, however, has taken note that the effect of the series of measures for curbing overall demand taken since last year has begun to become steadily permeant in the real phase of the national economy and that the tight money program thus is entering its final stage.

ago, indicating a slowing down in the quantitative rise.

In the balance of payments in November, the trade balance registered a surplus of $550 million on the strength of a sizable gain in exports.

The current balance also stood in the black to the amount of $120 million. On the other hand, long-term capital transactions registered a record deficit of $1,090 million.

The outflow in short-term capital dealings also swelled in November partly due to increasing expectations of the higher dollar in the future.

As a result, the overall balance of payments in No-

seasonally adjusted, after a gain of 3.5% in October. Exclusive of ships, however, November shipments dipped by 0.9% from a month ago.

Inventories in the mining-manufacturing sector, which sagged by 1.0% in October from the previous month, rose by 0.4% in November, seasonally adjusted.

The inventory-sales ratio index of manufactured goods held by producers (1970 100, seasonally adjusted) in November stood at 85.7, remaining at the same level as in October.

Private orders for machinery (exclusive of ships, seasonally adjusted) in November continued to record an increase of 4.3% following a sizable gain of 65.8% in October.

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[Excerpt from Nihon Kogyo Shimbun, February 19, 1974]

The government's "integrated circuit development promotion subsidies," for which grantees have been already designated, are targeted to five themes including silicongate E/D-MOS-LSI, C-MOS-LSI, and high-efficiency-industrial-use linear IC; and the development of these themes will be undertaken by two independent companies -- Hitachi and Toshiba -- and three groups organized from seven companies.

Of these groups, Mitsubishi Electric and Oki Electric as a group assumed the development of N channel MOS-LSI, specifically to work on low electricity consumption and high-speed micro processor. As for the division of labor between the two companies, Mitsubishi will develop micro processor's LSI itself and Oki the low cost package.

The two companies have so far maintained a cooperative arrangement in the development of the IC for ultra high-efficiency large computers for which the government was pushing hard to counter the liberalization of computers. With the receipt of the subsidies for the development of N channel MOS-LSI this time, they are strengthening the cooperative arrangement further to accomplish not only the objective of the subsidies but also other tasks.

As a part of the arrangement, the two companies established a "semiconductor conference" to exchange information, to make a division of labor and cooperation in the production process and to coordinate in sales.

Even though their cooperative arrangement may sound simple and reasonable in general theory, it is bound to bring about some conflicts in concrete cases will become a yardstick of measuring the merit of the arrangement.

NIKKAN KOYGO (Full)
March 20, 1974

IC Industry Circles to Make Every Possible Effort for Development of Technology; Subsidy Amounting to ¥1.8 Billion for Fiscal 1974 to Be Given Shortly to Eight Companies, Including Hitachi and Toshiba

In connection with the liberalization of IC imports, the subsidy for the development of technology amounting to ¥1.7 billion was already decided within the supplementary budget for fiscal 1973, and given to eight IC manufacturing companies. Following this, a subsidy amounting to ¥1.8 billion for fiscal 1974 will be given to those manufacturing companies as soon as the national budget for fiscal 1974 is formally decided. Those, which will receive the subsidy, will total eight companies, similar to those in fiscal 1973, namely Hitachi Ltd., Toshiba, Japan Electric, Mitsubishi Electric-Oki Electric Industry, and Fuji Communication Appliances-Sharp Electric-Kyodo Electronic Technology Research Institute. As a result of this, various manufacturing companies will do their best for the development of technology till the end of this year, when IC imports are to be liberalized. At the same time, there is the possibility that it will develop into the reorganization of IC manufacturing industry circles, depending on the way of their making progress in development.

Will Also Become Starting of Reorganization of Industrial Circles

The subsidy toward IC industry circles aims at promoting the development of IC's included in the important field of technology able to compete with advanced nations, including the US, as one of the counter-policies for the liberalization of IC imports, which is expected to take place in December this year. The Government appropriated ¥ 1.7 billion within the supplementary budget for fiscal 1973 and ¥1.8 billion within the budget for fiscal 1974. A subsidy, totalling ¥3.5 billion, is to be given to those manufacturing companies.

Eight companies Hitachi Ltd., Toshiba, Japan Electric, Mitsubishi Electric-Oki Electric Industry, and Fuji Communication Appliances-Sharp Electric-Kyodo Electronic Technology Research Institute, have already lined up. Therefore, MITI already allocated the subsidy amounting to ¥ 1.7 billiion for fiscal 1973 to those companies.

Various companies will promote research in and development of following items. Mitsubishi Electric and Oki Electric Industry will develop N channel MOS-LSI, Toshiba C-MOS-LSI, Hitachi Ltd. silicone-gate MOS-LSI, Japan Electric high-efficiency linear IC's for industrial use, Fuji Communication Appliances-Sharp Electric Kyodo Electronic Technology Research Institute multi-purpose linear IC's for industrial use.

In allocating the subsidy this time, MITI put stress mostly on joint development by groups of manufacturing companies. MITI expects that groups of companies engaging in joint development will maintain their co-operative structure in other fields henceforth without sticking to those kinds of items, which became the objects of a subsidy.

Already, Mitsubishi and Oki Electric Industry established the "Mitsubishi-Oki Semi-Conductor Consultative Council" in order to strenghten their co-operative structure in the IC sector further. For the time being, the Consultative Council will promote the joint development of LSI for micro-computers on which the two companies will promote IC development by forming a group. Also, those companies have the policy of utilizing the Council in holding over-all talks over the interchange of technical information on IC's and the allotment of production and sales operation in due course. As the two companies have already promoted joint development in the sector of large-size electronic computers, the relationship between the two companies will become closer because they are going to co-operate in the joint IC development, too.

Also, Fuji Communication Appliances-Sharp Electric-Kyodo Electronics Technology Research Institute have established a "summer conference," consisting of Managing Directors, and the "Joint Technology Committee" as a subordinate organ, consisting of Managers, for the promotion of joint development. Those three companies will take charge of developing multi-purpose linear IC's for industrial use with the Government subsidy this time. As Fuji Communication Appliances has high-level technology for microcomputers, Sharp for portable electronic computers and Kyoto Electronics Technology Research Institute for IC production, those companies have decided to make a joint study.

Kyodo Electronics Technology Research Institute had so far distributed linear IC's available for industrial use, to Sharp and Fuji Communication Appliances. This also contributed to the strenghtening of the relationship among those companies. Those companies have the policy of promoting positively their co-operation not only for those kinds of items, which became the object of a subsidy, but also for all IC sectors.

In view of such situation, it is conceivable that IC industry circles may be reorganized in the near future. It is viewed that domestic IC industry circles, which were thrown into confusion, will consolidate their structure step by step in an attempt to complete their counter-attack structure before the liberalization.

[No Name]
March 30, 1974

TO MAKE EVERY EFFORT FOR TECHNICAL DEVELOPMENT

ISSUING AID SOON: 1.8 BILLION YEN FOR FY 1974 TO 8 COMPANIES INCLUDING HITACHI, TOSHIBA

Accompanying IC import liberalization, 1.7-billion-yen Aid for technical development has been authorized by the revised budget of 1973, and it has already teen issued to 8 IC manufacturing companies. As the next measure, whenever the National Budget for 1974 approves 1.8-billion-yen-Aid for 1974, it will be issued to manufacturing companies. Companies which will receive the Aid, are the same as companies of 1973--Hitachi, Toshiba, Nichiden, Mitsubishi, Oki, Fujitsu, Sharp and Joint Electronic Technology Institution. Because of the Aid, IC manufacturing companies will make every effort for the technical development by the end of the year when the IC Import Liberalization comes into operation. Also, depending on the progress of technical development, it will lead to the reorganization of the IC industry.

CHANCE FOR THE REORGANIZATION OF IC INDUSTRY

The Government will issue 1.7 billion yen from 1973-budget and 1.8 billion yen from 1974-budget to the IC industry, as a countermeasure for IC import liberalization in December, aiming at developing the important IC part which can compete in advanced nations, such as the U.S.A.

Eight companies--Hitachi, Toshiba, Nichiden, Mitsubishi, Oki, Fujitsu, Sharp and Joint Electronic Technology Institution- have been declared to receive this aid. After receiving the declaration, MITI has already issued 1.7 billion yen from the 1973 budget.

Research development projects of individual companies are: Mitsubishi-Oki, N-channel MOS.LSI; Toshiba, C.MOS.LSI; Hitachi, Sylicone-gate MOS.LSI; Nichiden, High-performance Linear IC for manufacturing use; Fujitsu-Sharp-Joint Electronic Technology Institution, Linear IC for multilateral manufacturing use.

The most amount of projects encouraged by MITI was joint development by groups of several companies. MITI expects that the joint development cooperation system by several companies will lead to other areas technical development which will not be entitled however aid of relating to objective technology.

Mitsubishi-Oki has established the Mitsubishi-Oki Semiconductor Committee, and they will try to improve on the cooperative system in the IC area. For the present time, the Committee ____

____

Also, Fujitsu, Sharp and Joint Electronics Technology Institution have established a Top-level Committee with a General manager and a Joint Technology Committee with a manager. They have started to develop joint research projects. These three companies have taken charge of development of linear IC for multilateral manufacturing use. But because of high technical standards in certain areas by companies, such as Fujitsu, Microcomputer; Sharp, calculator; Joint Electronic Technology Institution, IC-- therefore, three companies will develop linear IC jointly.

The Linear IC for manufacturing use, was provided to Fujitsu and Sharp by the Joint Electronic Technology Institution. It brought three companies together. In the future, they will cooperate positively to develop IC areas not only of objective items of the Aid.

According to these events, the reorganization of the IC industry is anticipated, and domestic IC industry which has been out of control, will adjust the internal disorders to catch up with the import liberalization age.

NIHON KOGYO (Full)
May 13, 1974

US IC Capital-Strenthening Offensives; Aiming at Integrated Production; TDK Fairchild Will Double Capital in June

With the implementation of IC liberalization in December this year in the offing, moves of US IC manufacturers have become active. TDK Fairchild will double its capital to ¥915 million in June. Nautec concluded an agency contract with Kanematsu Semi-Conductor and resumed the sales of IC memories. In addition, Monolithic Memory's moves to set up a branch office in Japan have become conspicuous. Especially the offensives in the memory field, represented by 4K-pit RAM (random access memory), are gaining strength, aiming at the electronic computer market of our country. The home-manufacturing forces, which technically have one step forward yet to take, are nervous about such moves of foreign capital, with liberalization near at hand.

TDK Fairchild, which is a joint venture between Tokyo Electro-Chemical Industry and Fairchild Camera and Instruments, will double its capital in June, aiming at integrated IC production by 1977, ranging from waferprocessing to assembly, with MOS (metal oxidization semi-conductor) and IC's as the main-stay items. It is said that five technicians, sent to the Fairchild Head Office, are now receiving special training in the techniques for production.

Nautec, on the other hand, concluded a new agency contract with Kanematsu Semi-Conductor, and has recently resumed sales in our country, with memories as the object. Toward the end of last year, the manager of this company was replaced and the internal setup was renovated. With this as an opportunity, it has started its sales to our country, which were temporarily suspended. It will establish a Far East office in July to carry out full-scale sales.

Raytheon also has started activity, with the manager in charge of linear IC's coming to Japan early this month, to start sales of IC's for automobile use through New Japan Wireless, which is financed by the said company.

In addition, Monolithic Memory is planning to set up a branch office in Japan and participate in the market of our country. Harris Semi-Conductor will also establish a Far East office at the end of this month, in an effort to strengthen its sales setup toward our country.

In coping with these moves, the home-manufacturing forces have been intent on formulating future prospects since March, as it has become clear that demand for IC's will fall, like that for other electronic parts. Although they are showing confidence in LSI's (large-scale integrated circuits) for portable electronic computers because there is now hardly any technical gap in this field between them and US manufacturers, they still show differences in the fields of theoretical circuits and memories. Therefore, the offensives by US forces are being worried about, with liberalization close at hand.

As the moves of US special manufacturers are becoming active in the field of memories, which are said to hold a quarter of IC demand in the future, it has become inevitable that competition between domestic and foreign manufacturers will be focused on memories, in their offensive and defensive battles.

TUESDAY, JULY 23, 1974 THE JAPAN ECONOMIC JOURNAL

EYES RESOURCES-SAVING & KNOWLEDGE SETUP

MITI plans structural revamping of computer industry to meet decontrol

The Ministry of International Trade & Industry is going actively to implement measures to revamp the structure of the computer industry for coping with the industry's complete import and capital decontrol slated for next year.

This is because the Ministry envisages having the computer industry take the helm of its policy of switching the nation's industrial structure to one centered on resources-saving, technology and knowledge-intensive industries, and also because it attaches importance to the fact that foreign-capitalized computer makers, led by IBM, are still outstripping their Japanese counterparts both as to technology and sales in Japan.

As such, the Ministry is considering stretching the current cooperative setups of the three groups of computer makers—Hitachi, Ltd.-Fujitsu, Ltd., Nippon Electric Co.-Tokyo Shibaura Electric Co. (Toshiba) and Mitsubishi Electric Corp.-Oki Electric Industry Co.—from development of new series of computers to production and sales phases.

It also considers submitting a bill for a computer industry promotion law to the next regular session of the National Diet.

The concrete measures for computer decontrol the Ministry is now considering are:

—The Ministry will extend its aid to the computer industry, which up to this time has been centered on technological development, to production and sales phases.

—It will allow the three groups of computer makers to utilize funds of the Japan Development Bank at a special interest of 7.5% per annum when they strengthen their cooperative setups in production and sales phases.

—Computer usage in public organizations, such as schools and hospitals, will be increased so as to maintain a reasonable share of domestic computers in Japan.

—The industry's cooperative setups will be strengthened further by producing long-term programs for computer production, investments and technological development projects.

The three groups of domestic computer makers up to now have been grappling with developing new series of computers with the Government financial aid with the aim of countering their foreign counterparts, led by IBM.

As such, MITI now judges that domestic computer makers already have consolidated foundation to make them competitive with their foreign counterparts in the technical phase, but they still lag behind the latters in the produtcion and sales phases.

As to consolidation of cooperative setups in the production and sales phases, MITI plans to prod domestic computer makers to build up facilities to manufacture new computers, joint center for customers' software usage and computer educational facilities with special financing from the Japan Development Bank.

Exports for Siberian projects get under way

Big export deals have got under way between Japan and the Soviet Union in connection with their joint development of Siberian natural resources.

Of six projects for development of such resources as coal, petroleum, natural gas and timber, two are moving ahead. They involve exploitation of coking coal and felling of timber.

As for mining of coking coal at South Yakut, the project on which both countries first reached agreement, the Soviets have begun placing inquiries with Japanese companies for equipment necessary for mining by drawing on a $450 million bank loan to be provided by Japan.

Equipment covered by the inquiries are wide-ranged, including 4,500 motor vehicles, such as dump trucks and super-heavy duty trucks, 500 bulldozers, 100 power shovels, truck cranes, boring machines and coal-preparation equipment.

The Soviet Union plans to procure these equipment from Japan over three years, beginning next year. To conduct field tests of some equipment, it wants delivery of some 100 units of equipment and facilities started around September.

Talks on these sample exports have already been started. Managing negotiators for Japan include Nissan Diesel Motor Co. (concerning motor vehicles), Komatsu, Ltd. (bulldozers), Kobe Steel Ltd. (power shovels) and Nagata Mfg. Co. (coal-preparation equipment). Japanese companies involved say negotiations

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'Dozers are sold to Soviet Union

Caterpillar Mitsubishi Ltd. is going to export 100 CAT-D6C bulldozers and their spare parts, worth ¥1,200 million (approx. $4 million), to V/O Tractoro Export, the tractor corporation of the USSR.

Mitsubishi Corp. acted as a go-between in the deal.

The deal was signed as part of the basic contract signed between Japan Chip Trading Co. and V/O Expotles, the all Soviet lumber export corporation in

---

U.S. dealers wish to sell NC tools

Nearly 10 American dealers of machine tools are holding business talks here to sell Japanese NC (numerically controlled) machine tools in the U.S.

Industry sources say it is unprecedented that such a large number of dealers have been coming to Japan

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[redacted]

Third raise of au appears due to ta

Toyota Motor Co. and Nissan Motor Co., top two automakers, have fully accepted the request for a hike in price of cold rolled steel sheets made by Nippon Steel Corp.

A fresh factor thus has been added to the current uptrend in automobile production costs.

From the beginning of this year, automakers have been compelled to raise their car prices twice owing to a slackening of their sales.

Opinion thus had prevailed among them that they should avert a third price raise, but they have come to feel that it has become inevitable for them to resort to a third elevation because top two automakers already have accepted a larger-than-expected steel price raise.

As such, they are now beset with a dilemma that if they raise their car prices, their sales will decline further.

While cold rolled steel sheets of Nippon Steel Corp. were priced at an average of ¥47,200 (approx. $157) per ton before the current price raise, they actually were supplied to Toyota and Nis-

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Toyo Kogyo hopes to of Mazda Motors

Toyo Kogyo Co. has decided to treble the paid-up capital of Mazda Motors of America, its wholly-owned subsidiary in the U.S. in the near future under a program for streamlining its sales network in the U.S.

Under the same program, the automaker recently named Kiyoshi Matsuno, one of its directors in charge of export, president of its American subsidiary, and also approved the resignation of C.R. Brown, its vice president and general manager.

Of the planned capital boost of $6.9 million, the company already has received the approval from the Ministry of Finance and the Bank of Japan to the extent of $3 million. Appro-

THE JAPAN ECONOMIC JOURNAL

Japan's Supply Capacity (6)/ *Integrated Circuits*

Nation accounted for 25 per cent of world demand for semiconductors during 1973

[illegible]

[illegible]

Platinum—

[illegible]

SUBSCRIPTION RATES

Domestic : [illegible]

Overseas : [illegible]

Get Your Share of Prosperity

DAI-ICHI SECURITIES CO., LTD.

NIKKON KOGYO
December 12, 1974

"PLUNGING INTO IC LIBERALIZATION"

(Extract from panel discussion; remarks of NEC Executive Director Hattori)

"As Mr. Kubo [Hitachi] has said, the general problem is that makers cannot operate if there is no demand. Thus large capital investment for process and other manufacturing technologies is necessary. So my point is that you can't make large investments as long as the demand is not stabilized. This is not a matter of equipment or things like that.

"Looking back, it is quite clear that in the past, Japanese minicomputer makers have relied on American ICs, and MITI gave administrative guidance, putting these things on the negative list. I think it was only then that the domestic industry was able to say to themselves, 'now we can consider capital invest,' and they were able to take the first step, because the demand was stabilized. If MITI had not placed them on the negative list, the computer market would have been taken over willy-nilly by America. In short, unless there is some foundation, some backing, no one will have courage to do so. It would be so risky. This is the number one point. And if ICs for microcomputers were not placed on the negative list, capital investment would not have been possible by Japanese makers.

This meant that since MITI put up the negative list and gave administrative guidance, it was possible for us for the first time to stand on our own feet.

(SIA Translation)

NIKKAN KOQYO
December 21, 1974

"CONSIDERATION OF AN EMERGENCY TARIFF"

"Request To the Government as a Result of the Liberalization of IC Imports, and For Continued Capital Assistance"

Japan Electronics Industry Association (Chairman Tumaki Keizo), in view of the approaching overall liberalization of IC imports submitted a list of requests to the government concerning measures to be taken following liberalization. This was motivated by the situation of Japan's IC industry, which in the face of a recession and the growing influx of imports is facing severe conditions, and which, if liberalization is carried out, will suffer damaging blows.

The main requests are to strengthen observation of import prices, and to consider the imposition of emergency tariffs. The IC industry is in severe straits because of the recession, and the increase in imports. In October of this year according to MIT's statistics, the production of ICs for the same month of the previous year was 95.4 percent, and while the imports for the same month of the previous year was 128.2 percent. The share of domestic demand held by foreign imports has increased to 32 percent in real terms for January to October 1 to 26 percent for 1973.

In the face of these figures, if import liberalization is carried out, this share will become larger, and our IC industry will be dealt a severe blow. For this reason, it will be requested that because the IC industry will be dealt a devastating blow through sudden increases in imports, the monitoring of IC imports will be strengthened through checking of market prices and of import statistics, and that appropriate tariffs will be levied against unfair sales and also in cases of emergency.

And further, the present tariff system, including the most favored tariffs, will be reexamined for the purpose of guaranteeing the autonomy of Japan's IC industry.

Secondly, there is a 1 to 2 year gap in technology and productivity between U.S. firms and Japanese. In order to eliminate this discrepancy the government is being requested to continue its financial aid to these companies now suffering from red ink. There is a need for capital for technological development and the improvement of production plant, and for nationalization.

Thirdly, in view of the fact that the demand for ICs is growing rapidly, not only in the electronics industry, but in the automobile, watch, camera and other new fields, it is necessary to deepen the interrelationships with these industries and enlarge the use of Japan-made products. Appropriate guidance that will assist both sides of production and demand is requested, because it is important that the demand for national products be enlarged.

In addition, it is desired that the Government provide guidance and assistance because it is important that the government and civilian sectors work together in proposing legislation and for executing these various measures to strengthen the IC industry, to promote its healthy growth, by attention to the flow of imports, and taking appropriate measures.

NIHON KEIZAI,
December 24, 1974

"Overall Import Liberalization Tomorrow"

MITI AID TO INDUSTRY TO CONTINUE

MITI has decided on the 23d to carry out the liberalization of ICs as of the 25th. This is based on a Cabinet decision made last June to liberalize IC imports by 1974. The products affected this time are ICs which have over 200 elements in their circuits. ICs with less than 200 elements have already been liberalized as of April of 1973. Because of that fact, this amounted to the complete liberalization of IC imports.

As a result, the number of products among the Brussels tariff categories will be reduced from the present 30 to 29. (7 trade products and 22 agricultural products).

The liberalization of ICs (over 200 elements) will take place during this year, but the determination of the effective date still remains. Thus Japan's liberalization on the 25th meant that it had extended liberalization to the time limit.

Meanwhile, in preparation for the liberalization of IC capital and imports, MITI has given a total of 3.5 billion yen in subsidies to promote the development of ICs, and has encouraged the development of high capability ICs, and by awarding this subsidy money, it has contributed to the technological improvement of Japan's IC industry.

The IC industry is a sector which has high strategic value in the development of the electronic industry, but by the same token, it can be anticipated that over the long run the Japanese IC industry can again fall below the international level.

Nihon Keizai,
December 24, 1974

"DO WE ADVANCE TOWARD A REORGANIZATION OF THE IC INDUSTRY?"

It has been decided that ICs of over 200 elements will be liberalized from the 25th. MITI states "the Japanese makers have reached the international level." The fact that subsidies and emergency import restrictions are now going by the board, Japan's IC industry, having been liberalized, has been deprived of its government protection, and now faces the task of standing on its own feet as a business, including reorganization.

MITI has up to now strongly urged the Japanese calculator makers to use national products as well as applying restrictions on imports and capitalization. Moreover, in 1973 and 1974, a total of 3.5 billion yen in subsidies were granted to 8 companies including, Hitachi, NEC and Toshiba, and thereby sought to promote the development of new types of ICs. Within the industry there are such strong views such as "We have eliminated the technical gap with the U.S." (NEC), but in America the production of 0 and MOS (metal oxide) elements for microcomputer use, 4IC memories and the like has been on track and has surpassed Japanese makers with a lead of about 2 years.

The only elements that are competitive technologically and on scale of production with the U.S. are the calculator use LSIs, but even here, with the collapse in prices of the calculators, the price of LSIs has dropped by 1/3 in a year.

The number of orders is also not increasing. As a result, the Japanese industry is faced with the need to develop measures for the post-calculator LSI. But while the LSI market is going down, Hitachi has not only suffered the drop in price in computer use and LSIs, but it has suffered a double punch from TI competition and the recession, and was forced to reduce its production TTLs by over 50%, and it is on the verge of dropping TTLs altogether....

As a result of these developments, the onslaught of foreign capital that accompanies liberalization has made it necessary for counteraction, and it is anticipated that the makers will mutually adjust their production area responsibilities and strive to increase their production. Of course, from the standpoint of the Japanese market, it is believed that there should be only 3 makers instead of the existing 12 Japanese IC makers (of which 6 market abroad). In view of this judgment it is anticipated that the intermixing of Japanese & foreign firms will result in some disorder.

JEI JOURNAL OF ELECTRONIC INDUSTRY OF JAPAN

and the magnet will fix the panel securely to the wall. Thus, there will be no holes left in the wall even after the panel is removed. Sumitomo 3M's tape rubber magnet is capable of holding a weight of about 80 grams per cm².

Another example is the magnetic conveyor which makes the best possible use of the advantages of both magnet and rubber.

Manufacturers eye automobile industry

However, some expectations do not include immediate applications in these new areas, at least, for the time being, manufacturers are focusing their attention on the automobile industry. There are already a large number of electrical devices inside a car, and the number is expected to rise in the future. Such electric equipment must withstand high temperature and shocks.

Ordinary rubber magnets offered by Sumitomo 3M can withstand a maximum temperature of 95°C, but another magnet with special kind of rubber can withstand a temperature of up to 240°C. The company also produces various types highly resist-

Rubber magnet makers are thus developing products aimed at increased application in the auto industry. Meanwhile, U.S. auto makers are all carefully keeping an eye on the use of rubber products and have already succeeded in developing no-contact ignition systems using rubber products as one way to help control exhaust fumes. ●

JEI March 1975

Competition May Short-Circuit Japanese IC Industry

The Japanese IC industry has been thrown into the rough and tumble of free competition since overseas investment and IC imports were liberalized from last Dec. 1 and, from Dec. 25 respectively. These liberalization measures came at a time when the Japanese economy as a whole was undergoing a depression and they are expected to have a far-reaching effect on the IC industry in the months ahead.

The current depression of the electronic industry, which is more or less a by-product of the transition from rapid to stable growth, has been aggravated further by the worldwide oil crisis. Under these circumstances, no sharp growth is expected this year for the components industry, including the semiconductor and IC manufacturing industries, which were Japan's leading growth industries. However, this transition is both necessary and unavoidable, and in a sense, the current depression offers an opportune chance for the parts industry to improve its overall set-up.

Japan's IC industry has grown rapidly in the past few years to rank beside its U.S. counterpart so far as the manufacture of LSI (mainly P channel MOS ICs) for electronic calculators is concerned. However, in the manufacture of other ICs, particularly industrial digital ICs, the Japanese industry is thought to be two or three years behind the U.S. even though it has been protected by Government measures.

Imported ICs garner 33% of domestic market

IC imports plunged to ¥2.9 billion (about $9.66 million at ¥300 to the dollar) in September last year, only to bounce back to their previous level of ¥4 billion (about $13.33 million) in October. In the first 10 months of last year, imports accounted for 33 per cent of Japan's total IC market. This compares with 22 per cent for 1972 and 26 for 1973. These figures show that imports are increasing. Usually, the import of a certain product is liberalized only after Japan's domestic industrial conditions are sufficiently strong to accept the after-effects and imports decline sharply before liberalization. This obviously does not apply to the present case since most Japanese IC manufacturers are struggling hard to survive.

Japan's computer industry shares comm with IC industry.

Before overseas investment was fully liberalized last December, overseas firms were able to own up to 50 per cent of a joint venture with local interests. As regards IC imports, a Japanese enterprise could import ICs containing up to 200 elements, although it was required to obtain a government import license for ICs with over than 200 elements. However, the fact that large quantities of LSI were imported into Japan, should not be ignored since without them, it would have been impossible for those industries engaged in manufacturing equipment for the information industry, particularly the computer industry, to have attained their present level of development.

Commenting on the industry's future prospects, one IC maker said, "Large quantities of ICs are certainly being imported into this country. But after liberalization, U.S. IC makers will be mounting a vigorous in Japan, especially as there no checks on imports by the of International Trade and In This will deal us heavy blow"

In the past, the import of ICs was checked when se were domestically manufac this restraint has now been

The Electronic Industries As of Japan at the end of last ye the Government to keep closer eye on IC imports and subsidies to the IC industr same time, domestic ma making a double effort to their technical and financial

Specialization trend by Japanese manufacturers

For the time being, many IC makers intend to cope free import of ICs by conc on specialized ICs instead of all types of ICs.

However, in view of the many leading U.S. IC maker already established setups manufacture of many types it is expected that Japanese IC will have to fight hard again overseas offensive.

In conclusion, Japan's IC has finally been forced to stand own two feet, and although domestic manufacturers resented the developments to this situation, overseas producers, no doubt, welcome opportunity to gain a free and access to the Japanese market

Ever Growing Electronics with

March 18, 1975

NEC & Hitachi are scheduled to sharply increase output of LSIs

Nippon Electric Co. and Hitachi, Ltd. have decided on greatly boosting their output of large-scale integrations (LSIs) from next month.

This is because the two leading LSI makers feel that their present LSI production scales have become inadequate for maintaining the break-even point as a sequel to the stiffening price cut race and they note that domestic demand for LSIs for electronic desktop calculators has been rising lately. (Output of desktop calculators this year is expected to reach 1,900,000 units.)

As two other major IC makers—Mitsubishi Electric Corp. and Tokyo Shibaura Electric Co. (Toshiba)—already have announced plans to step up LSI output, Japan's IC makers appear destined to head into a mire competition characterized by a vicious circle of price cut and production boosts.

NEC and Hitachi now together account for a 70 per cent share of the Japanese LSI market. They are going to increase their monthly LSI output by 25 per cent to around 1 million units from the present 800,000. Hitachi hopes to boost the output further to 1,200,000 units in the near future.

The unit price for LSIs has dropped to less than one-third of a year ago because of cutthroat sales competition among makers. The standard unit price for LSIs for 8-digit desktop calculators, for instance, has dropped to Y600 from Y1,800 a year ago.

Even Hitachi, top LSI maker, thus has come to feel that its monthly output of 1 million units has become unprofitable and that even a monthly output of 1.2 million units will be barely profitable.

Astounded by the extremely low prices of LSIs here, Texas Instruments Japan, Ltd., Japanese affiliate of Texas Instruments, Inc., is studying exporting MOS. LSIs it started manufacturing in Japan last year to the desktop calculator division of its parent firm.

TUESDAY, APRIL 15, 1975

THE JAPAN ECONOMIC JOURNAL

NTTPC and computer makers plan super LSI to curb IBM advance

The Nippon Telegraph and Telephone Public Corp has reached agreement with three leading domestic computer makers on undertaking joint research to develop a super large-scale integration (LSI) for constructing a computer capable of rivalling International Business Machines Corp's planned Future System.

Those that have agreed to cooperate with NTTPC are Hitachi, Ltd., Nippon Electric Co. and Fujitsu Ltd.

The governmental corporation that monopolizes domestic telecommunications services and the three computer firms have decided jointly to tackle development of a super large LSI from their common recognition that such an LSI is essential for enabling them to compete with IBM's fourth generation Future System (FS).

Up to now, the four have been trying to develop such an LSI individually. This means that they now are going to unify their activities.

Industry quarters said that IBM now is known to be working on an LSI having a capacity for memorizing 16 million bits of data.

The Japanese, in contrast, were reported so far to have reached the stage of only experimentally developing an LSI having a memory of 4,096 bits.

The agreement among NTTPC and the Japanese computer makers was said to call for spending about Y10 billion over a three-year period, starting from the current fiscal year, for achieving the following objectives:

A Clean Room, essential for LSI production, will be set up by this autumn.

The corporation will offer technological assistance and promote exchange of know-how among the computer makers on the basis of the results attained by the joint research machinery to be set up.

—The corporation will offer its facilities for the use of the makers.

For the present, the research theme will be the memory phase as this is the most feasible topic of collaboration at the beginning. With the advance of research, work will be extended to the logic element area.

The Japanese makers have snatched up the corporation's collaboration proposal as being a big policy step forward to develop a computer capable of competing with the IBM FS.

As for the Ministry of International Trade & Industry, it hopes to earmark appropriations, if possible by as early as fiscal 1976, for the purpose.

As to developing such a computer, MITI reportedly already hopes, even if limited still to development of a powerful LSI and basic technology, completely to unify the present three computer firm groups: Fujitsu-Hitachi, Nippon Electric-Tokyo Shibaura Electric (Toshiba) and Mitsubishi Electric-Oki Electric Industry.

In the long-range, it is known to be intending to go on further to achieve a fresh revamping of the industry structure.

Hitachi and TRW will try to get earth station order

Hitachi, Ltd. recently decided to join the race to obtain the order for building an earth station for the Earth Resources Technology Satellite B, planned by Japan's National Space Development Agency.

The company, with TRW, Inc. as its U.S. partner and Marubeni Corp., trader, already has revealed readiness to join the order-taking race to the Agency.

After the U.S. firm dissolved its tie-up with Mitsubishi Electric Corp., industry quarters here had been taking great interest in TRW's next choice of a Japanese partner.

The tie-up between Hitachi and TRW for obtaining the order for the proposed satellite station thus is regarded as an indication that the two now will work together in developing new satellites for Japan's space development and meeting demand for space equipment in Japan.

Quarters concerned, meanwhile, consider that such a close partnership will give momentum to regrouping of the Japanese space development industry.

With entry of the Hitachi-TRW group, six groups now are certain to participate in the tender for the proposed satellite.

Others are Tokyo Shibaura

LSI export to SEA

Sharp Corp. has decided to export large-scale integrations for desktop calculators to Taiwan, Hong Kong and the Republic of Korea.

Hitachi, Ltd. and Nippon Electric Co., both major LSI makers, already have begun exporting similar integrations to the Southeast Asian region.

Broadcasting station

Sumitomo Shoji Kaisha Ltd

Hitachi
ultra s

Hitachi, Ltd. is
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Known as HITA
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While Hitachi
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Industry circle
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has decided to meet the inquiry from the Soviet Ministry of Electronic Industry concerning Sharp's liquid crystal application by inviting experts from the Ministry to the company's factory and laboratory by this autumn.

As for the American inquiries, notably from General Electric and RCA, concerning its thin-film electro-luminescent element, Sharp plans to offer them knowledge as soon as it has become sure of commercializing it.

According to Sharp, its liquid crystal application method known as Dynamic Scattering Mode (DSM), when applied to production of the indicator of electronic desk calculators, features putting some additive chemical into a given liquid crystal to make it easy for ions to flow about inside the crystal.

When electric pressure is [illegible] such a device is highly economical in electric power consumption averaging the need for only 500 microwatts per square centimeter.

Sharp also has applied such crystal to making the indicator of electronic wristwatches. In this case, a different method called Twisted Nematic-Field Effect Mode (TN-FEM) is employed to make the light shot into the crystal absorbed by the crystal and to produce black images with a filter.

The company will continue to develop its liquid crystal application technologies through refinement of the two methods. The Russians seem to be interested in the electronic desk calculator-applied method.

Sharp's thin-film electro-luminescent element promises wide application in making various surface light-emitting devices, especially terminal indicators of an electronic [illegible] working life and weakness of brilliance.

The corporation recently attained with its own element 15,000 hours of working life, three times that of conventional elements, and 1,500 footlambert of brilliance, five times.

The corporation also has succeeded in enlarging the indicating surface and discovered that such element has a memory capacity. For the moment, Sharp is pushing toward its initial target of applying the element to the flat wall-hanging type of TV set.

named Dentsu Network Servic

October

The largest J

vertising company

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While the hardwa

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Two makers will collaborate in ultra LSI development

Hitachi Ltd. and Fujitsu, Ltd. last week announced agreeing with each other on undertaking joint research on development of ultra large-scale integration.

Salient points of their agreement are:

Concentrating both firms' researchers at one place to have them conduct intensive research.

Jointly manufacturing a prototype next generation computer on the basis of the ultra large-scale integrations to be developed.

Equally sharing development funds, rights and tasks relative to joint research projects.

They now intend to form a joint research organization and enter into official talks with Mitsubishi Electric Corp., their possible research partner, on the project after the Ministry of International Trade & Industry and Nippon Telephone & Telegraph Public Corporation jointly determine the gist of their proposed ultra large-scale integration development program, possibly by the middle of this month.

Judging from developments so far, it appears most likely that the three firms will set up a new joint firm this summer to undertake the entire proposed project, ranging from development of ultra large-scale integration to manufacture of a prototype next generation computer.

The tri-company move is being closely watched as it falls in line with the International Trade & Industry Ministry's plan to unify domestic computer makers into two groups — Hitachi-Fujitsu-Mitsubishi and Nippon Electric-Toshiba.

JE.J
7/1/75

Citizen starts direct U.S. watch selling

Citizen Watch Co., and Citizen Trading Co., have launched marketing of Citizen-brand watches in the U.S. under a full scale direct-sales program.

Citizen set up a representative office in Los Angeles early in February, followed by the opening of a locally-incorporated sales company in late April. Actual sales operations started in June.

At present, Citizen manufactures a total of 10 million wristwatches a year, more than 80 per cent of which are exported to over 100 countries.

Initial plans call for a Citizen watch export target of about 500,000 units per year to the U.S.

Cheapest digital watch

Orient Watch Co. is going shortly to market a fully-electronized digital wristwatch, called Quartz Standard, in a Y32,000-35,000 price range, the cheapest of all digital wristwatches so far made in Japan.

This is expected to spur price-cut competition among digital watchmakers.

Hitachi and Fujitsu un new large-scale compu

Two new, large-scale computers have been jointly announced by Hitachi, Ltd. and Fujitsu, Ltd.

The new models, M-160 and M-170 are the third and fourth in the M-series, following the M-180 and M-190 which were introduced in November, 1974.

The development of the M-series is the result of a technical tie-up agreement made in October, 1971.

Since reaching the agreement, the two companies with support from the Japanese Government have placed major emphasis on developing a computer series capable of competing internationally.

The joint development program has thus far produced the four large to super-large M-series models and is currently developing three medium and small-scale V-series computers.

The two companies are planning to develop two more M-series models to supplement the present four M-series models in order to further increase the capabilities of the M-series and thereby increasing the competitive power of the series as a whole.

The M-Series mod

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The new M-160 ar

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terface advantages and

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developments as high

auxiliary storage, large

film, communication

processors, virtual storag

it was said.

Toshiba & NEC add ACOS models

Nippon Electric Co. and Tokyo Shibaura Electric Co. (Toshiba) jointly have announced marketing the large-capacity System 800 of their ACOS computer series.

Both companies entered a technical partnership relation for developing a new computer series to compete against IBM 370 Series in 1971, and came out with the ACOS computer series in May, last year.

Following the medium-capacity System 400, 300 and 200 computers marketed in May, last year, they put on the market the large-capacity System 700 and 600 computers in November, last year.

With the System 800 com

marketed, they have comp

the line-up of six models

ACOS series, ranging

small to large versions, le

only two ultra large-cap

versions—System 900 and

The developers say

System 800 computer has

the performance of IBM 37

computer.

Nippon Electric say

received orders for some

units of System 400, 300 and

computers and about 20 unit

System 700 and 600 comput

as of March-end.

Toshiba also says it has

tained orders for total 40 unit

ACOS computers.

ASAHI
July 15, 1975

Computer Industry: Stepping to 2-group system
Super LSI: Unifying Research and Development
Establishing New Organization Next Year

According to the Government and MITI, on the 14th, due to enforcement of complete liberalization in the Japanese computer industry, Minister Komoto, MITI, and President Yanezawa, NTT, will meet on the 15th and they will agree to establish a unified system to develop the super LSI which is the most important elements for the next generation computer system. In addition, MITI will notify this plan to domestic computer companies. The research and development system which will start in 1976 is 1) establishing a new organization as a main body for super LSI development; division of 5 domestic companies into 2 groups: they will join the organization; and research basic development jointly, and 2) the new organization will cooperate with NTT which has developed super LSI for telecommunication use by itself, and regarding the common research and development area, the organization and NTT will unify to develop it. This plan is joint development plan for Super LSI which is the core element of computer. Moreover, the plant which leads the Japanese Computer Industry and had divided into 3 groups, will now change to a 2 group system. By taking this opportunity, Japanese Computer Industry s reorganization issue and enforcement of international countermeasures will be started.

The background of the new organization system which will lead the reorganization of industry, is due to complete computer liberalization. Enforcing the computer industry's constitution is a big issue. Moreover, because of IBM's progress in FS development which is the next generation computer, there is a strong fear to enforce developing countermeasures to meet this threat in Japan. Also, with reference to Japanese companies technical standards and financial power, MITI has judged that it is impossible to develop technology quickly by themselves. By establishing the aid for research and development for the Super LSI as the core, MITI plans to cooperate within the industry, and MITI will try to promote the 2-group system in the future.

According to the plan, NTT's aims at starting Super LSI research and development for telecommunication use, and development of Super LSI for business computer have different characters, but there are many being over-lap areas in developing Super LSI. Therefore, they will cooperate in order to achieve far-sighted goals. Also, the "Super LSI Research Development Union" (tentative name) which is the main body to develop the Super LSI for business computer, will let 5 computer companies (excluding Oki from original 6 companies) to join the Union. They will be divided into 2 groups: Fujitsu, Hitach and Mitsubishi in one grouo and Nichiden and Toshiba in another group. The Union will take charge of as many areas as possible of development, and two groups or an individual company will add individual techniques to them to develop productivity.

MITI has, therefore, teen planning to raise funds for a 4-year-plan from 1976. The sum of the Aid will be several billion yen. MITI will request it from the Budget as the most important business for trade administration.

Shaking Mitsubishi-Oki Cooperation System

Japanese computer companies were divided into 3 groups in 1971 under MITI guidance: Fujitsu-Hitachi, Nichiden-Toshiba, and Mitsubishi-Oki. Since 1972, they have received Aid from the Government to develop Japanese-made computers which can cope with IBM, aimed at 1976. Under this situation, by announcing the research organization system for Super LSI, the development system for the next generation computer was indicated. Regarding this, this Aid plan is only for the development of Super LSI. It is not for the development of the next generation computer. Therefore, MITI does not show any indication on the development of a system for a new computer. However, the development of Super LSI covers the memory element area to the circuit area. Therefore, even though MITI does not indicate any reorganization plan for the computer industry at the present time, as a natural progress, a computer system will be integrated by this 2 group system. The majority opinion is that MITI s real intention is there.

Therefore, companies which had unofficial indication by MITI, showed a positive attitude because they were to receive Aid. On the other hand, they are very careful about "re-reorganization" of the industry s constitution. Especially, because of the exclusion of Oki in the 2-group system, Mitsubishi-Oki cooperation system will become shaky. Depending on companies' attitudes, the joint research and development plan might face difficulties.

ASAHI (Page 8)(Full) July 22, 1975

MITI's Super LSI Concept to Start; Electronic Computer Model Also Will Be Developed; Fujitsu, Hitachi, and Mitsubishi Will Establish Joint Research Institute in Fall

Three persons--Hitachi President Hirokichi YOSHIYAMA, Mitsubishi Electric Machinery President Sadakazu SHINDO, and Fujitsu Vice-President Taiyu KOBAYASHI--heard explanations from Machinery and Information Industries Bureau Director General Hachiro MORIGUCHI, at MITI on the 21st, on the concept for the development of super LSI's for the next-stage computer, which concept has been firmed up by the said Ministry. They expressed their intention to co-operate in it across the board, and at the same time conveyed their plan to establish a new research institute jointly financed by the three companies, first of all, on the basis of the said concept for pushing the development by dividing the industry circles into two groups. On the other hand, Japan Electric and Toshiba, which are said to be the other group, are also checking into creating a joint research structure. Thus, the new setup, shown by MITI toward development of the next-stage computer, will take a big step forward toward materialization.

Japan Electric and Toshiba Will Set up New Sector in NTIS

MITI's concept consists of the following:

(1) Research and development of super LSI's, which are the core of electronic computers in the next age, will be

pushed with the concerted effort of the Japan Telegraph and Telephone Public Corporation, which is starting on them for tele-communication purposes, and electronic computer industry circles.

(2) Domestic manufacturers will be divided into two groups, one consisting of Fujitsu, Hitachi, and Mitsubishi, and the other of Japan Electric and Toshiba--and a super LSI research and development association will be formed by these two groups to conduct joint research of basic fields. On such undertakings as to put LSI's to practical use, development will be pushed by the techniques of the two groups, respectively.

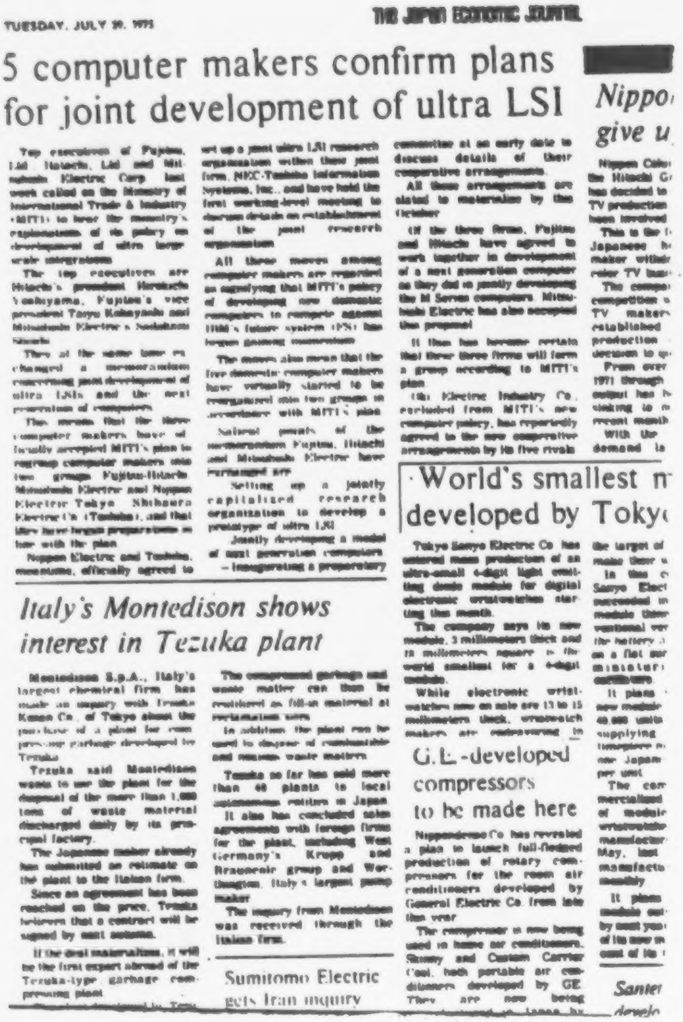
As it is a concept shaking the present setup of domestic manufacturers, which are divided into three groups -- Fujitsu-Hitachi, Japan Electric-Toshiba, and Mitsubishi-Oki Electric -- what formal intention the industry circles will show was being watched.

According to what was clarified that day by the three companies, namely, Fujitsu, Hitachi, and Mitsubishi, mutual agreement was reached on the following points: (1) The three companies will establish a new research institute in the form of a joint stock company, by about October; (2) the research institute will engage not only in the development and trial manufacture of super LSI's but also in the development of a model of the next-stage electronic computer; and

(3) a preparatory committee for the establishment of the research institute will soon be established, and concrete development items, the annual plan, the number of necessary personnel, the rate of investment, etc., will be decided. They will sign a memorandum in the near future.

Mitsubishi Electric Machinery President Sadakazu SHINDO, whose moves have been noted in connection with Oki Electric, said at the press conference held on the 21st: "The computers which have been jointly developed by the two companies will be sold with joint efforts in the future, too. Even at a stage where the next-stage computer has been developed, relations of mutual complementation will be continued, as hitherto, in the fields of peripheral units and parts."

On the other hand, the Japan Electric-Toshiba group has agreed to set up a super LSI joint development sector in the Japan-Electric-Toshiba Information System (NTIS), a company established by the two companies in March last year for planning in the computer sector and co-ordination of the development structure. On the 21st, they started talks on a concrete structure.



TUESDAY, JULY 30, 1974

THE JAPAN ECONOMIC JOURNAL

5 computer makers confirm plans for joint development of ultra LSI

Top executives of Fujitsu, Ltd., Hitachi, Ltd. and Mitsubishi Electric Corp. last week called on the Ministry of International Trade & Industry (MITI) to hear the ministry's explanation of its policy on development of ultra large-scale integration.

The top executives are Hitachi's president Hirokichi Yoshiyama, Fujitsu's vice president Taiyu Kobayashi and Mitsubishi Electric's Sadakazu Shindo.

They at the same time exchanged a memorandum concerning joint development of ultra LSIs and the next generation of computers.

This means that the three computer makers have officially accepted MITI's plan to regroup computer makers into two groups: Fujitsu-Hitachi-Mitsubishi Electric and Nippon Electric-Tokyo Shibaura Electric Co. (Toshiba), and that they have begun preparations in line with the plan.

Nippon Electric and Toshiba, meantime, officially agreed to set up a joint ultra LSI research organization within their joint firm, NEC-Toshiba Information Systems, Inc., and have held the first working-level meeting to discuss details on establishment of the joint research organization.

All these moves among computer makers are regarded as signifying that MITI's policy of developing new domestic computers to compete against IBM's future system (FS) has begun gaining momentum.

The moves also mean that the five domestic computer makers have virtually started to be reorganized into two groups in accordance with MITI's plan.

Salient points of the memorandum Fujitsu, Hitachi and Mitsubishi Electric have exchanged are:

Setting up a jointly capitalized research organization to develop a prototype of ultra LSI.

Jointly developing a model of next generation computers.

— Inaugurating a preparatory committee at an early date to discuss details of their cooperative arrangements.

All these arrangements are slated to materialize by this October.

Of the three firms, Fujitsu and Hitachi have agreed to work together in development of a next generation computer as they did in jointly developing the M Series computers. Mitsubishi Electric has also accepted this proposal.

It thus has become certain that these three firms will form a group according to MITI's plan.

Oki Electric Industry Co., excluded from MITI's new computer policy, has reportedly agreed to the new cooperative arrangements by its five rivals.

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Italy's Montedison shows interest in Tezuka plant

Montedison S.p.A., Italy's largest chemical firm has made an inquiry with Tezuka Kosan Co. of Tokyo about the purchase of a plant for compressing garbage developed by Tezuka.

Tezuka said Montedison wants to use the plant for the disposal of the more than 1,000 tons of waste material discharged daily by its principal factory.

The Japanese maker already has submitted an estimate on the plant to the Italian firm.

Since an agreement has been reached on the price, Tezuka believes that a contract will be signed by next autumn.

If the deal materializes, it will be the first export abroad of the Tezuka-type garbage compressing plant.

The compressed garbage and waste matter can then be reutilized as fill-in material at reclamation sites.

In addition, the plant can be used to dispose of combustible and noncombustible waste matters.

Tezuka so far has sold more than 40 plants to local autonomous entities in Japan.

It also has concluded sales agreements with foreign firms for the plant, including West Germany's Krupp and Brauneroir group and Worthington, Italy's largest pump maker.

The inquiry from Montedison was received through the Italian firm.

Sumitomo Electric gets Iran inquiry

World's smallest m
developed by Toky

Tokyo Sanyo Electric Co. has entered mass production of an ultra-small 4-digit light emitting diode module for digital electronic wristwatches starting this month.

The company says its new module, 3 millimeters thick and 18 millimeters square, is the world smallest for a 4-digit module.

While electronic wristwatches now on sale are 13 to 15 millimeters thick, wristwatch makers are endeavoring to

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G.E.-developed compressors to be made here

Nippondenso Co. has revealed a plan to launch full-fledged production of rotary compressors for the room air conditioners developed by General Electric Co. from late this year.

The compressor is now being used in home air conditioners, Stowy and Custom Carrier Cool, both portable air conditioners developed by GE. They are now being

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Computer Industry Seen Revamped; Joint VLSI Development Agreed

National Project

Foreign Investments

The International

THE JAPAN ECONOMIC JOURNAL

75

SECURITIES

Computer makers grow swiftly but suffer from fund shortages

Japan's electronic computer industry has made a rapid growth in the past 10 years with production increasing by around 17-fold in value. The growth is expected to continue high in the next five years with an average annual gain of 25 per cent considered likely.

OUTPUT OF DIGITAL ELECTRONIC COMPUTERS IN JAPAN

(In billions of yen)

	Main Frame	Peripheral equipment	Total
[illegible]	17.5	14.0	31.5 (100)
[illegible]	30.0	30.6	60.6 ([illegible])
[illegible]	44.0	44.0	88.0 ([illegible])
[illegible]	66.0	74.8	140.8 ([illegible])
[illegible]	89.4	89.5	178.9 ([illegible])
[illegible]	175.4	144.3	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

Domestic computer manufacturers in the past few years have been endeavoring to develop large-type machines and foster overseas markets. Such efforts have been gradually bearing fruit.

However, such efforts of computer makers are facing difficulties, particularly in the phase of funds for financing research-development projects.

With complete decontrol of restrictions on foreign investments in Japan's computer industry scheduled to take effect at the end of this year, Japanese computer manufacturers have been placing top stress on expanding the share in the domestic market side by side with development of large models.

In fact, the market share of IBM Japan has been marking time some around 1973 while the comparable share has advanced by around 2-3 per cent for two top domestic manufacturers, Fujitsu and Hitachi.

COMPUTER MARKET SHARE IN JAPAN

([illegible])

	In terms of	
	[illegible]	[illegible]
IBM Japan	28.0	16.3
Fujitsu	19.8	20.5
Hitachi	16.1	19.0
Nippon Electric	10.7	16.7
Toshiba	5.0	3.9
Mitsubishi Electric	4.0	3.7
[illegible]	5.6	5.6
[illegible]	1.5	2.1
[illegible]	10.6	7.6
[illegible]	100.0	100.0

However, Japan's share in the world computer market still stays low at only 4.2 per cent, standing far below the global share of 37.9 per cent of International Business Machines Corp.

SHARE ON THE WORLD MARKET

([illegible])

	Share (Per cent)
IBM	37.9
H/S	6.5
UNIVAC	6.8
Burroughs	4.6
CDC	3.5
NCR	2.3
ICL	2.0
Total of Japanese computer makers	4.2
Others	[illegible]

Domestic manufacturers in the past few years have been devoted to projects for developing computers sufficiently competitive with IBM's 370 Series. Among such Japanese computers, the M Series jointly developed by Fujitsu and Hitachi has been highly rated. Inquiries for these new Japanese series have been relatively brisk.

Japanese manufacturers also are tackling the job of developing a new series aimed at competing with IBM's FS (Future System) Series by earmarking large outlays for investments in studies in the field of super-large scale integrations.

In this new field, computer manufacturers also are facing various snags, mostly financial. Among them, whether they will be able to raise sufficient funds for developing and selling larger models and whether they will garner sufficient profits from sales of such models enough to absorb a huge burden for study-research undertakings are offering two major problems to be tackled and solved.

In the future course of Japan's computer industry, overseas markets are bound to hold a heavy weight. However, computer sales overseas generally are based on the rental system.

Under the circumstances, the need of raising large funds for financing rental services is likely to pose a new problem for domestic manufacturers which are engaged in rental operations through Japan Electronic Computer Co., an exclusive finance corporation for computer rental services.

Another burden is the continuously swelling outlay for research and development projects. In the case of Fujitsu, for example, the research-development expense accounts for around 15 per cent of sales, offering a major factor to squeeze the company's profitability.

The recent slump of noncomputer divisions (computer manufacturers mostly are making and selling other electronic and electric machines) is another drag on the earnings of computer makers. Among them, Hitachi, Ltd., Tokyo Shibaura Electric Co. and Mitsubishi Electric Corp. have registered profit dips for three consecutive semiannual terms since the March, 1974 period.

Bo

The bond market [illegible] ended August 23 conti[illegible] as minor monetary [illegible] stayed away from [illegible] while some securi[illegible] panies took to sacri[illegible] from fund shortages [illegible]

The "Third NA[illegible]" interest bearing NT[illegible] dipped sharply to Y9[illegible] 21. The ultimate inter[illegible] the same series at t[illegible] the week stood at 9.6[illegible] for the first time [illegible] February.

The rate in [illegible] dealings also cont[illegible] advance to around [illegible] cent per annum for th[illegible] items from around 9.8[illegible]

Bonds

Govt. bonds

Industrial Bank of Japan

Nippon Fudosan Bank [illegible]

Tokyo Electric Power [illegible]

NTT[illegible] bonds [illegible]

NTT[illegible] bonds [illegible]

World Bank bonds

Convertible bonds

[illegible]

[illegible]

Tokyo Shibaura Electric

CORPORATIONS IN THE NEWS

Pioneer Ele

The stock of Pioneer Electronic Corp. continued to stay low, following the year's high of Y1,720 so far registered on July 3. However, it has continued to remain lower at a relatively high level between Y1,430 and Y1,580. The stock thus has continued a steady stance in a liquidating market.

Securities analysts ascribe its relatively firm move primarily to the company's favorable business performance.

For example, the company is expected to sell and profit more in the current annual business term ending this September on the strength of its top specialties. At the same time, the company has continued to maintain a stiff buoyancy both in sales and profit in the past 10 years.

At this time when many corporations have begun to fare poorly under the impact of dulling consumption expenditure and dwindling private plant and equipment investments, the stock is one of the limited number of leading issues for stable investment owing to its past performance and sound future business outlook.

having registered 200 [illegible] to top selling at 100.0[illegible]

Transactions in the investment trust oper[illegible] recorded an unusu[illegible] over selling to the 740,000 shares in 100,000 shares du[illegible] August 1-13 period.

In fact, the dip [illegible] electric-electronic [illegible] Pioneer and Sony

WEEKLY STOCK MOVEMENT

early [illegible]

large

[illegible]

TUESDAY, AUGUST 26, 1975 ✓ THE JAPAN ECONOMIC JOURNAL 7

State of oligopoly is emerging in desktop calculator industry

The desktop dalculator industry is beginning to assume an oligopolistic nature with the domestic shipment share of the three leading makers lately exceeding 80 per cent.

The three leaders are Casio Computer Co., Sharp Corp. and Omron Tateisi Electronics Co.

Informants said that the fall-back of makers which had been challenging the so-called Big 3 lately has become conspicuous.

They said that the rough-and-tumble competition among makers that took place last year has given way to a growing oligopolistic trend.

Most of them felt that price cutting now had reached a limit and brand name was going to become increasingly important in sales in the future.

According to the Ministry of International Trade & Industry's monthly statistics, shipments of desktop calculators in May, including exports, reached about 2,040,000 units. Of this, it is judged that those for OEM makers ran to slightly more than 350,000 units.

This means that the shipment volume of 13 makers that are members of the calculator section of the Japan Business Machine Makers Association amounted to slightly less than 1,700,000 units. Domestic shipments ran to around 35 per cent of this, or about 600,000 units.

Taking this as a base figure, the market shares of the leading firms in May are judged to be as follows:

Casio—about 54 per cent; Sharp—21 per cent; Omron Tateisi—about 10 per cent.

In other words, the three accounted for about 85 per cent.

The share of latecomer makers in this field ran to about less than 5 per cent, each, with Canon and Matsushita Communication Industrial ranking in such order of importance.

Most industry people feel that the present distribution of market share will continue into the future.

This outlook indicates that the "outcome of the battle" in this area already has been decided.

Rather than price cutting, competition looks due to shift in the future to retail selling at the consumer level, which means that brand name is going to be important.

With the frontal competition between Casio and Sharp, lesser ranking makers have been adversely affected.

Since the advent of this year, Hitachi, Ltd. has pulled out of the calculator field, the poor business of Eiko Business Machine surfaced in July and Canon was compelled to pass its dividend in the semi-annual business period ending June.

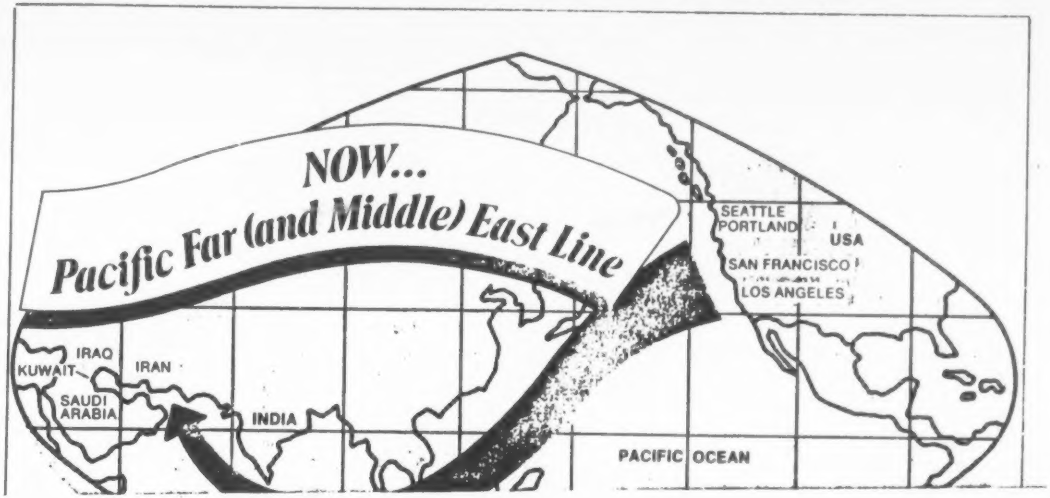
The oligopolistic trend particularly has been strengthening in the area of personal use calculators.

The makers in this sector may be roughly divided into three groups. They are:

—The top group of Casio, Sharp and Omron Tateisi which can produce over 400,000-500,000 units of personal units monthly.

The scond group of Matsushita, Sanyo Electric, Ricoh and General which will hold their production in line with their selling capacity and prefers producing office calculators of high value added.

The third group, including Ise Industrial Instrument Corp., which concentrates on OEM exports.



MACHINERY

5 makers finalize fund and other aspects to compete against IBM

Five major Japanese computer makers have shaped up their final schedule for development of a new generation of computer to compete against IBM's future system in talks with the Ministry of International Trade & Industry.

Their schedule includes the financing aspect.

The five computer makers are Fujitsu, Ltd., Hitachi, Ltd., Mitsubishi Electric Corp., Nippon Electric Co. and Tokyo Shibaura Electric Co. (Toshiba).

They earlier had agreed to form a solid alliance to develop a new computer for coping with IBM's future system, expected to be unveiled around 1980.

They hope to complete the first new computer in one or two years, at the latest, after shipments of IBM's future system start, or by the end of fiscal 1983.

According to their schedule revealed recently, the period of development is eight years from fiscal 1976 (starting April, 1976) through fiscal 1983.

For this period, the five computer makers will invest a total ¥250 billion, including the cost for development of ultra large-scale integrations.

Of the total fund, ¥45 billion will be met with a governmental subsidy.

The total fund breaks down into ¥200 million for development of computer architecture, ¥100 billion for development of ultra large-scale integrations, ¥71.8 billion for development of hardware such as processing devices, terminal systems and mass production equipment, and ¥73 billion for development of software, such as basic computer design, manufacturing technology and processing programs.

MITI judges that if the five makers succeed in developing a new computer as scheduled, they will be able to maintain a 50 per cent share, or the present share of the domestic computer market.

Sharp will step up output of semiconductor products

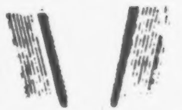
Sharp Corp. has decided to build a new factory adjacent to its present Tenri semiconductor factory to double its output of semiconductor-related products such as solar batteries, large-scale integrations and light emitting diodes.

It is scheduled to start construction of the new factory early next year, complete it next autumn and put it into full-fledged operation in 1977. The new factory is estimated to cost about ¥3,500 million.

Sharp, though still being a latecomer in the semiconductor field, is now actively developing new technology such as for production of solar batteries. With the planned expansion plan, it eyes greatly raising its share of the Japanese semiconductor market.

Its planned factory construction is believed to be related to its participation in the quintet venture to develop silicon single crystals with Kyoto Ceramic, Matsushita Electric Industrial, Mobil Oil and Tyco Laboratories.

The company plans boosting its monthly output of large-scale integrations to [illegible] units from the present [illegible] by the end of this year, and further boosting it to 1 million upon completion of the new factory.



British, American medical equipm't firms stage shows

British and American medical equipment makers have started stepping up their sales drives in Japan by holding exhibitions of their latest products in Tokyo in rapid succession, and other Western counterparts are likely to follow suit.

The "Second British Medical Equipment Exhibition" was held early in September at the British Export Marketing Center in Tokyo under the joint sponsorship of the British Hospitals Export Council and the British Embassy.

Participating in the show were a total of 17 firms. The first of the series of these exhibitions held last year simply had been a show of products, but this time technological seminars were also offered on the spot to explain the exhibits.

Among the typical entries were new respiratory and biochemical treatment equipment and X-ray equipment for brain trouble diagnosis.

American producers are remarkably active with 51 of them scheduled to enter [illegible]

Sanyo chalks up strikingly good results in exporting

Despite the export slump in the electric appliances industry, Sanyo Electric Co., as an exception, looks due to chalk up an excess of exports over domestic sales in value [illegible] export value and ratio will be a record high.

Such favorable exports have continued from the first half (December, 1974-May, 1975) when exports ran to ap-

DENPA SHINBUN
October 14, 1975

LSI FOR COMPUTER DECREASES PRICES
JAPANESE MAD, INCREASINGLY CONCENTRATED OLIGOPOLICY
COST-DOWN BY MASS-PRODUCTION SYSTEM

There is a rapid decrease in prices in LSI for computer use. LSI for computer experienced stable prices by keeping a balanced demand-supply. However, with the progress of a mass-production system in which one company produced 800 thousand to 1 million units, IC has started to show cost-down trends, recently.

Because of the personalizing of the system, computer production is in the good business. Related parts also show active business.

Main parts are Key-board switches, numeric indicating tubes, and LSI. Among these parts, manufacturers start to produce keyboard switches increasingly. Therefore, computer parts manufacturers continuously experience cost-down because of the mass production system. Numeric indicating tubes have two different types which are fluorescent indicating tubes and LED. However, both fall into mannerism, then they have a trend to increase their cost price. Because of increasing cost in fluorescent indicating tubes, there were some moves to use LED. But, due to lack of expansion of a new market such as an electronic watch, the price of LED became almost the same as one of the fluorescent indicating tubes.

Domestic Manufacturers Overwhelm Foreign Manufacturers

Domestic leading companies such as Nichiden, Hitachi, etc., overwhelm US manufacturers in market share of LSI. Because the demand-supply has been kept in good balance, the price is stable. Regarding th import of goods, the lowest price of FOB is $1.50, but the domestic sales price is around 500 yen for an ordinary rocket.

Reaching Present Price in Rapid Pace

Since adoption of the 1-chip system, LSI for calculator use reduces its cost widely. Especially, during 1-2 years, reduction of prices varied widely from 1,800 yen to 800 yen, and reached the present price of 500 yen, rapidly. The reason of this rapid reduction in price was because of the establishment of the mass-order system as well as over competition. After beginning of this year, the price has been stable for almost 10 months, because of good demand-supply balance.

Manufacturers cannot make two ends meet on this IC trend. Regarding US manufacturers as an example, leading companies, such as Texas Instruments, Rockwell International, and National Semiconductor, etc., have shown red-figures in the calculator division. There are several companies which are rumored to be closing down their calculator divisions.

Result to Raise Outsiders

In the domestic market, there are obvious trends of oligopoly by leading companies, and second and third ranking companies have reduced their production and have increased their orders to other companies. Enforcing orders to other companies, results in expansion of outside-companies. Due to these concentrations oligopoly increases.

Therefore, leading calculator manufacturers can make it possible to request for double/triple orders for supply of LSI, and some manufacturers have already started to do business in such a way.

Domestic manufacturers hesitate to reduce cost by mass-order because they are very busy. But US manufacturers show a forward looking attitude to deal with it.

LSI can make result in serious cost-down trends by mass-order. In addition to the mass-production, there are more possibilities of reducing cost by technical improvements. Mass-order which is accompanied with manufacturers oligopoly, will bring cost down of LSI for calculator use.

ASAHI SHINBUN
October 16, 1975
Page 8

Super LSI Development Establishment of Research Institution funded by Fujitsu, and Mitsubishi

Among Japanese manufacturers which have started to develop Super LSI for the next generation computer system through MITI policies, Fujitsu, Hitachi and Mitsubishi had a meeting on the 15, and agreed to establish the main organization for the joint development project. MITI s idea of reorganizing industry structure of 3-group-with-companies to 2-group-with-5-companies, received industry s attention because it would be a reorganization of the computer industry. By establishing the research institution funded by 3 companies, MITI's idea will get on the right track.

Contents concluded by three companies, are 1) preparation for establishing the institution (adopting a corporative system, initial capital: 300 million yen) this month, and starting its operation in December; 2) Mr. Tetsu Kojima will be appointed as a President and 2 board-members will be selected from each company; 3) The research institution will develop not only Super LSI but also a model system for the next generation computer.

Among three companies, Fujitsu and Hitachi have established a close relationship. But, Mitsubishi had a cooperative system with Oki. Therefore, there were several differences that had to be adjusted.

Another group, Nichiden-Toshiba, will develop Super LSI at Nichiden and Toshiba Information System.

Je. J. Nov 18, 1975

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U.S. computer concerns intensify Japan strategy

Kiyoto Kaneda

Nihon Keizai Editorial Correspondent

In about two weeks, effective December 1, the remaining restrictions on foreign investment in the Japanese computer industry and import of hardware will be completely removed. Key domestic computer makers, however, do not seem to be feeling much of a tangible threat from this, although they concede they do have some misgivings about what might happen.

Behind their self-confidence is the fact that they successfully have prepared themselves for the total exposure to international competition through efforts of their own and heavy government financial assistance aimed at fostering a domestic computer industry strong enough to compete with IBM.

Yet foreign computer firms' moves to make an inroad into the Japanese market are going into a higher gear, even prior to the December decontrol. Conspicuous are those by Burroughs Corporation and Data General, both of the U.S.

Japanese makers, however, are generally calm. Says an executive of Fujitsu Ltd., Japan's largest computer maker: "It was way back in 1937 that IBM started business in Japan as Japan Watson Statistical and Accounting Machines. After the war, IBM Japan was set up in 1950. We don't think the forthcoming decontrol means anything radically new."

In other words, any changes that may be brought about by the liberalisation measure are considered to be limited to only a part of the Japanese computer industry, which will largely remain unshaken.

The six domestic computer makers—Fujitsu, Hitachi, Nippon Electric, Tokyo Shibaura Electric, Mitsubishi Electric and Oki Electric—are slated to exhibit at the 1975 Japan Computer Show, starting in Tokyo this week, a new series of computers developed with government subsidies aimed specifically at bracing up to meet the foreign capital and import decontrol.

On display will be System 200, 300 and 700 of the ACOS Series 77 turned out by the team of Tokyo Shibaura Electric and Nippon Electric, M-170 and 180 of the M Series by the Hitachi-Fujitsu group and Models 300 and 700 of the MELCOM-COSMO and OKITAC-COSMO serieses by the Oki-Mitsubishi group.

All of these new models are designed as rivals of IBM 370 and makers are quite confident about the capacity of their products. Fujitsu's spokesman proudly says: "M-180 and M-180 are made entirely with LSIs and ahead of IBM 370 technically."

Another encouraging thing to domestic makers is the program for development of ultra LSI to be launched next fiscal year with subsidy from the Ministry of International

(Continued on Page 8)

...di Arabians plan to ...te desalination firm

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interest over a long period.

The remainder will be secured from ordinary financial quarters by the projected firm.

The projected joint venture initially will produce five units of seawater desalination facilities each having a daily processing capacity of 5 million gallons.

At first, the local production ratio will be put at 30 per cent with the percentage of local production being gradually raised.

As to technological assistance, Sasakura will sign a contract with the projected company and will offer it guidance.

The Japanese will send 22 persons from Japan to work for the new company, with the Saudi Arabians employing 80 persons. The head of the new company will be a Saudi Arabian.

The informants revealed that C. Itoh and Sasakura had been

For successful business with Japan you need long-term prospects.

As one of Japan's leading long-term credit banks with assets of more than $17 billion, we are specialized in medium- and long-term financing and maintain good banking relations with major Japanese companies.
Our staff of experienced banking experts has a thorough

U.S. computer concerns—

(Continued from Page 1)

Trade & Industry. Development of LSI of millions of bits, as against 4,000 bits of the currently available LSI, is essential to make computers competitive with IBM's next generation computer, so-called "Future System."

Under the guidance of the Ministry of International Trade and Industry, two groups of makers have been formed for the development of such LSI. One of the groups is that of Fujitsu, Hitachi and Mitsubishi Electric, and the other is that of Nippon Electric and Tokyo Shibaura Electric.

Foreign makers in the meantime are already making inroads into the Japanese market.

Data General, world's second largest mini-computer maker after Digital Equipment Corporation of the U.S., recently reached agreement with Japan Mini Computer Corp. on acquisition of a minority interest in the latter.

Although the U.S. firm initially sought a majority interest in the Japanese firm, the equity share is likely to be held down to about 30 per cent because Japan Mini Computer was founded in 1971 under the initiative of the Ministry of International Trade & Industry, giving it a character of being a national policy concern. Among the Japanese firm's seven shareholders are Kozo Keikaku Kenkyusho, a software concern, and Takeda Riken Kogyo, an instrument maker.

Data General has long been hoping to get an operating foothold in the fast-growing mini-computer market in Japan, especially in the fields of educational and medical equipment.

In another development, Burroughs Corporation has recently raised its equity share of its joint venture in Japan, Takachiho Burroughs, to 96 per cent from 50 per cent. The petroil-based firm's takeover of Takachiho Koshi, is expected to be followed by a sweeping top management shakeup in the near future, complete with a change of the corporate name according to industry sources.

Besides this, moves of such foreign concerns as the Japanese branch of DEC, Yokogawa Hewlett Packard and Control Data Corporation are expected to be intensified after the December 1 liberalisation.

The Japanese computer industry, however, is concerned more about moves of U.S. computer lease firms, which could have a major impact if they start business with used IBM machines at low leasing charges in Japan. At the moment, however, such a move has yet to surface.

NIHON KEIZA
Page 3
(Full)

MITI Fixes Date for Complete Liberalization of Computer Imports at December 23; Will Take Measures to Strengthen Domestic Manufacturers through Re-organization and Low Interest Loans

100 percent capital liberalization of electronic computers will be started on December 1, but MITI has fixed the date for complete liberalization of product imports, following this, at December 23. With this, our country's electronic computer industry circles will enter a complete liberalization setup, including the 100 percent capital liberalization of software, which is to be carried out from April 1 next year. In this regard, domestic manufacturers say that "Our setup for interception has been completed." However, they leave uneasiness over the technical differentials in software and over financial power. MITI's policy is to strengthen the constitution of domestic manufacturers by such means as the Development Bank's low-interest loan to Japan Electric Computer (JECC, jointly financed by six electronic computer companies).

Since the Government announced the policy for capital liberalization of electronic computers and that of product imports in July 1971, it has provided an interim period of about five years until the complete liberalization of software on April 1 next year. During this period, the Government, aiming at "fostering domestic manufacturers capable of countering IBM," concentrated the six domestic manufacturers into three groups -- Fujitsu-Hitachi, Japan Electric-Toshiba, and Mitsubishi Electric-Oki Electric. Thus, the Government has had each of these groups push development of machines countering IBM's 370 series, which was the ultra-modern computer at that tim370 series, which was the ultra-modern computer at that time. As to aid measures, on the other hand, it paid subsidies amounting to a total of 46,600 million from fiscal 1972 to fiscal 1975.

As a result, the various groups have succeeded in developing machines coping with IBM, and they have announced one new machine after another since last year. MITI is guaranteeing these machines, saying, "They can fully counter foreign machines in both the fields of performance and cost." Industrial circles themselves are also beginning to gain self-confidence, extricating themselves from IBMphobia.

Greeting the age of liberalization at long last, at such a stage, both domestic and foreign electronic computer manufacturers will plunge into the "age of civil war" over electronic computers. Both MITI and various domestic manufacturers are to some extent confident of their interceptive setup by their present machines, but they have faint uneasiness about their competitive power in the future.

In concrete terms, (1) The possibility is strong that IBM will develop, in the near future, new machine FS (Future System) using ultra-large integrated circuits, which machine is far superior in performance to the present machine; (2) domestic manufacturers are inferior to IBM in the techniques for using electronic computers, and the present competitive power tends to be decided by relative superiority in software; and (3) IBM is promoting technical development and sales, with its ample power of funds in the background, and Japanese manufacturers cannot compare with it in the field of funds.

To counter the FS of IBM, therefore, MITI has decided to push research and development of ultra-large-scale integrated circuits, with the combined efforts of various domestic manufacturers and the Telegraph and Telephone Public Corporation. It intends to give subsidies amounting to a total of about 45 billion for four years from fiscal 1976. Also, with the development of ultra-large-scale integrated circuits as the lever, the Ministry will re-organize the domestic electronic computer manufacturers from the three group to date into two -- Fujitsu-Hitachi-Mitsubishi and Japan Electric-Toshiba. In addition, its policy is to expand the scope of aid from research and development to production and sales.

As to software, in which domestic manufacturers are weak in competitive power, the Ministry is negotiating with the Finance Ministry to increase sharply the number of subsidies to the Information Processing Promotion Enterprise Association, to switch the present software production by manual work to the formula of using electronic techniques, and enhance reliability by rapidly improving the productivity of programming.

Also to reduce the financial burden of various domestic companies, accompanying the rental back of electronic computers, MITI wants to expand the Development Bank's low-interest loans to the Japan Electronic Computer Company, and thus complete a setup enabling them to counter US manufacturers, including IBM, which have strong financial and selling power.

Facing the Liberalization of Import of Electronic Computers

RECOMMENDATIONS (SUBCOMMITTEE ON THE INFORMATION INDUSTRY OF THE INDUSTRIAL STRUCTURE COUNCIL)

DECEMBER 12, 1975.

1. The computerization in our country has been steadily developed, with the rapid technological innovation in the background, in not only industries but also every field of Japanese economy. As the needs of the nation for the computerization get even diversified under the restricted supplies of raw materials and energy resources, it has become an acute necessity to advance the computerization further.

The electronic computer industry is to become the core of the industry's structure of our country, as it is an intelligence-intensive, resource and energy-saving and pollution-free industry itself, and as it is vital to the computerization.

2. Because of such importance of the industry, various measures by the Government have been carried out to strengthen the competitiveness of the manufacturers of the national computers (JCM). This, together with manufacturers' own efforts, has made it a reality that the national computers get over half of the national market. However, as the liberalization of the capital investment in the electronic computer industry has recently become effective and importation will be liberalised soon, it is essential for continued healthy development of the electronic computer industry of our country that all the concerned brace up themselves, become one solid entity and face the problems.

3. The Government is requested to enrich promotional measures that have been in effect for some time, and to become active in developing such newly necessitated measures as helping development of super LSI for next generation of the electronic computers.

A keener competition is anticipated after the liberalization. As a result, healthy development of the electronic computer industry of our country can be hampered. It is necessary to consolidate the statistics systems to properly keep hold of trends of importation and installation on electronic computers after liberalization, so that proper countermeasures can be taken when significant harms to the national industries, such as rapid decrease of the market share of the national computers, are anticipated.

4. Enterprises of electronic computer industry of our country are requested in order to grow steadily in the harsh environment after the liberalization, to realise the needs for stepped-up management efforts, to concentrate in improving business health, to promote further cooperation among businesses and to establish single system of the industry for R. & D. as it becomes necessary.

5. It is necessary to reconfirm the continued preferential use of the national computers after the liberalization by the Government agencies in line with the cabinet decision of September 11, 1972. Positive cooperations of the agencies are requested. It is also necessary to study such measures, to insure actual effects of preferential use of the national computers as practiced by European nations.

It is requested that local government agencies, industrial and financial businesses also acquire deeper understanding of the national computers and cooperate in buying them.

6. The information processing industry is requested to promote with full strength, as the liberalization of capital investment comes in effect at the end of the year, improvement of technological capability and health of the business. In addition to enrichment of the present measures, it is requested to develop and promote actively the new measures to radically modernise and rationalise the software production.

On Liberalization of Import of the Electronic Computers

DANWA (INFORMAL TALK) BY THE MINISTER OF INTERNATIONAL TRADE AND INDUSTRIES

DECEMBER 19, 1975.

Our country has been actively promoting import liberalization in order to internationalize the economy. As a part of the same efforts, we have decided that the main frames of electronic computers and others are liberalized completely for importation as of December 24 of this year. This reduces the number of items of the list of residual quantitative restriction of import of our country by two to 27 items.

This import liberalization of the electronic computers is based on the judgment that, partly because of number of measures by the Government in the past, it is possible to let the electronic computer industry of our country stand by itself with feet fixed on the ground even after the import liberalization.

The electronic computer industry is a typical of the intelligence-intensive industry. It will increase the importance to the economy, society and people's life of our country in the future, and is expected to develop into a major export industry. It is upon this understanding that I request the industry to consolidate to do the best under internationalized environment on occasion of the import liberalization.

At the same time, the cabinet meeting has decided today the countermeasures to be carried out in the future as follows:

The Government should watch the trend of the electronic computer market, expecting self-reliance and future growth of the electronic computer industry of our country after the liberalisation, so that the liberalization may not affect the national manufacturers adversely and the electronic computer industry of our country may not be thrown into confusion. It has been decided to ask local governments, industrial and financial businesses, not to speak of the Government agencies, to understand and acquire proper knowledge of the national electronic computers.

The Ministry of International Trade and Industries recognises that it is essential for the self-reliance and development of the electronic computer industry of our country that the national computers get the reasonable share of the market in our country. The Ministry has made it known that it will watch the trends of importation and installation of the electronic computer in the market of our country, and powerfully deploy various promotional measures such as promoting development of super LSI for the next generation of the electronic computers and securing rental fund for the national computers.

It is even more important after the liberalisation that the national electronic computers receive proper understanding and get utilized. I would like to ask everybody concerned for sufficient cooperation in this regard.

Source: *Monthly Report of the Electronic Industry* (published by the Japan Electronic Industry Development Association), vol. 18. No. 1, January 1976.

On the Liberalization of Import of the Electronic Computers

DECISION OF THE CABINET MEETING

DECEMBER 19, 1975.

The measures have been carried out for some time until now to develop and strengthen the electronic computer industry, since it will become more and more important to the economy, society and life of the people of our country in the future.

At the import liberalization that will become effective on December 24 of this year, looking forward to self-reliance and future growth of the electronic computer industry of our country, the Government has decided to keep watching the trend of the electronic computer market so that the liberalization may not affect the national manufacturers adversely and the electronic computer market of our country may not be thrown into confusion.

The Government has also decided to ask a wide range of people in local as well as central governments, industries and financial businesses to understand and acquire proper knowledge of the national computers.

SOURCE: *Monthly Report of the Electronics Industry* (published by the Japan Electronic Industry Development Association), vol. 18, No. 1, January 1976.

MITI Minister Sends "Buy Japanese Computers" Request Letters to Public Sector, Utilities, and Banks

On March 10, 1976, MITI disclosed that it had sent letters signed by MITI Minister, Mr. Komoto, to local public organizations, financial organs, power industries, and educational institutions. In this letter, the MITI Minister asked the addressees to "promote the introduction of domestic computers to foster the domestic computer industry and to expand its share. The Minister asked them to use domestic computers to protect the Japanese computer industry from any sudden decrease in share due to full liberalization of computer imports, and, moreover, recently announced Japanese models have become comparable to foreign models in performance. This letter is one of MITI's efforts to protect the Japanese computer makers by securing new customers, along with subsidizing development of new computer models.

The full liberalization of computers became effective on December 24, 1975. Prior to liberalization, the Industrial Structure Council's Data Processing Industry Committee had made the following proposals.

(1) If the share of domestic computers falls quickly, some adequate measures must be taken.

(2) The industry must make all the efforts to strengthen the computer enterprise structure, to promote mutual cooperation, and to establish a good research and development system.

(3) Governmental and other public sector offices must give priority to domestic computers.

In response to these proposals, MITI said that some urgent measures (customs duties, safeguards) must be taken if the domestic manufacturers' share falls by 10% within a short period.

The share of domestic computers was 56.2% of as September 30, 1975. The share has been rising quickly. The share was 55.2% as of March 31, 1975. The share grew as much as 1% within only half a year. Recently, the share increase is especially obvious in the field of large models, although this has been a weak point in the Japanese computer industry.

However, foreign computers are used by many governmental, semi-governmental and public offices. Minister Komoto issued this letter in consideration that the domestic computer industry must be fostered and developed by giving a fair evaluation of its technological standards. That is, if a Japanese model is on an equal level as a foreign model, the Japanese model should be selected. The letter was sent to various organizations, educational institutions, banking organs and local public organizations. It asks to make a fair evaluation of the performance of domestic computers and to promote their installation.

The share of domestic computers in use at governmental and government-related offices, local public organizations, and various other organizations as of September 30, 1975 is given below.

	Installed units	Value in million yen	Value in million dollars	Share percent
Governmental offices	[illegible]	72,075	240.3	82.6
Government-related offices	862	170,310	567.7	85.6
Local public organizations	601	45,185	150.6	67.8
Cooperative societies and miscellaneous organizations	1,763	53,700	179.0	67.8
Universities	563	42,560	141.9	[illegible]
Financial institutions	[illegible]	[illegible]	1,276.5	34.5
Electricity, gas, and water utility services				23.4

Note: US$1=¥300.

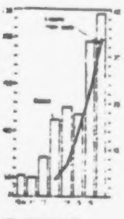
Source: [illegible], Mar. 11, 1976.

TUESDAY MAY 24 1977 THE JAPAN ECONOMIC JOURNAL

ESTABLISHMENT OF ORDERLY SYSTEM IS VITAL PROBLEM

Exports of integrated circuits register big increase from cooling of domestic demand

[illegible]



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Exxon—

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ELECTRICALS & ELECTRONICS

Toshiba and NEC agree on tightening computer ties

Nippon Electric Co. and Tokyo Shibaura Electric Co (Toshiba) announced last week that they had basically agreed to tighten their business tie up relations on the ACOS series computers.

The ACOS series are medium- and large-scale computers developed jointly by the two companies to compete with IBM 370 computers.

According to the agreement, Toshiba will transfer its ACOS computer sales division to NEC-Toshiba Information Systems, Inc and will devote itself to the manufacture and sales of small computers, as well as the development and manufacture of medium-large computers.

NEC-Toshiba Information Systems is a NEC-Toshiba joint venture originally set up for development of large-scale integrations (LSI).

This means that Toshiba hopes to revamp its medium-large computer sales division whose business is in a serious slump, although its sales of smaller computers are going well.

Toshiba plans to transfer a considerable number of its ACOS computer sales division staffers to NEC-Toshiba Information Systems.

NEC also agreed to dispatch its sales staffers to the joint firm, but it will not transfer its ACOS computer sales division to it.

Fujitsu will organize computer lease firm with 9 companies

Fujitsu, Ltd will set up within this month a computer rental company with eight city banks and one life insurance company.

The banks are Dai Ichi Kangyo Bank, Ltd., Industrial Bank of Japan, Ltd., Kyowa Bank, Ltd., Taiyo Kobe Bank, Ltd., Mitsubishi Bank, Ltd., Saitama Bank, Ltd., Bank of Tokyo, Ltd and Bank of Yoko-

Fanuc, Ltd., 10 per cent jointly by Dai Ichi Kangyo Bank and Industrial Bank of Japan, and 5 per cent each by the other banks and Asahi Mutual Life Insurance.

The new computer rental firm is a new version of Japan Electronic Computer Co., a computer financing company set up by six Japanese computer makers in 1961.

CHEMICALS & TEXTILES

Ten fiber firms will continue production cutback under cartel

Presidents of 10 leading synthetic fiber companies have agreed to file a production cartel application with the Fair Trade Commission soon so that they and five subsidiaries can continue production curtailments. Approval is virtually certain.

The recession cartel plan, which the top fiber executives hope can be started by April, closely resembles the current production cuts carried out under advice from the Ministry of International Trade and Industry.

Specifically, the fiber industry wants the cartel approved for the April-June quarter, during which production would be curtailed for nylon filaments, polyester filaments and staples, and acrylics staples. Fiber spinning facilities would be sealed off to curtail production of fibers for domestic sales.

The presidents also agreed that the Japan Chemical Fibers Association should monitor both curtailments and production volumes. Percentage figures for production cuts will be worked out by slightly modifying the current 25-30 per cent cuts.

All makers of the three major fibers want to participate except for Kanegafuchi Chemical Industry Co., whose modacrylic fibers are a special item.

Toho Rayon Co., whose subsidiary Toho Beslon Co. produces acrylics, will join this time, although it refused such an offer when the industry considered cartel formation early last year.

Kagayaki Miyazaki, president of Asahi Chemical Industry Co. and Japan Chemical Fibers Association, said, "The industry was strongly guided by MITI to transfer to a voluntary cartel" from the current curtailments authorized by the ministry's advice.

The MITI advice will have helped production curtailments from October 1977 to March 1978. When such curtailments were renewed for the January-March quarter, FTC told MITI that it would not approve a second extension.

JCFA started to work on the plan at the beginning of this year, when a cooperative atmosphere prevailed, as exemplified by plans for tie-ups by two pairs (Asahi Chemical and Kanebo Ltd in one and Teijin Ltd and Unitika [illegible]

Ukishima's big ethylene plant to start up in Apr.

A large ethylene plant with an annual capacity of 400,000 metric tons will be started in early April by Ukishima Petrochemicals Co., a joint venture of Mitsui Petrochemical Industries, Ltd and Nippon Petrochemicals Co. The ¥47-billion plant is at MPI's petrochemical complex in Chiba.

Sluggish demand for petrochemical goods forced the two parents to delay completion, originally planned fall [illegible] second plant started in August 1974.

Nippon Petrochemicals will suspend production at its ethylene plant, capable of 62,000 tons annually. Also Mitsui Petrochemical will halt its 175,000 tons a year unit at Chiba.

As a result the three companies will be capable of annual ethylene production of [illegible] tons, compared with their plan to consume [illegible]

OFFERS HOPE OF GREATLY WI

NTTPC devel to cut cost in '

Nippon Telegraph & Telephone Public Corp has developed a new technology for staging "television conferences" — a conference between distant parties made possible by use of TV receivers and public telephone lines — which reduces transmission costs to one fourth.

NTTPC, the sole operator of Japan's domestic public telecommunication networks, said its cost-cutting process was "Tridic" — "Triparameter Interframe Codic" system.

The corporation has found the process so promising that it plans to introduce it into its service in fiscal 1978.

Though very effective and high in development potential, this type on a tri Japan w

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An experimental 'television confere

TUESDAY, MAY 2, 1978 THE JAPAN ECONOMIC JOURNAL

BY TELEPHONE CORP. AND THREE COMPANIES

VLSI memory chip of extremely high concentration is developed

A very large-scale integration (VLSI) memory chip that has on its surface of only 20.6 square millimeters 131,072 bits of electronic elements equivalent to 170,000 transistors has been developed by Japan's public telecommunication corporation with three domestic semiconductor makers, it was recently learned.

The 128 K (Kilo) bit read-only memory (ROM) chip possesses the greatest concentration of electronic circuitry ever known anywhere, Nippon Telegraph & Telephone Public Corporation said recently in disclosing it.

Nippon Electric Co., Hitachi, Ltd. and Fujitsu Limited assisted in completing the new memory chip that is double as dense in circuitry concentration as its 64 K bit equivalent NTTPC developed last autumn. The 64 K bit is said to be of the same capacity as a new American product now under commercial development.

Commercialization of the new memory chip still is expected to take several more years.

However, it links up with Japan's current Government-industry efforts to develop a full-fledged VLSI circuitry, the key to the development of a "dream computer" of tomorrow.

Experimentally applied to storage and reading-out of Chinese characters, the new memory device has worked so well that only four of such chips can accept almost all of Japan's official list of 1,850 simplified Chinese characters for daily use. NTTPC thus visualizes immediate application of the device to Chinese character printing or displaying terminal apparatus of a large computer system.

According to NTTPC, the new memory chip completed at its Musashino Electrical Communication Laboratory in Tokyo also features Japan's first practical application of a direct circuitry p
method using electron b

Each chip was prod
only 30 seconds with a
line width precision of
microns. The achieveme
expected to accelerate
industrial adoption
method, although app
later than Internationa
ness Machines Corp
U.S. which is said to h
ready started mass pro
of such chips by th
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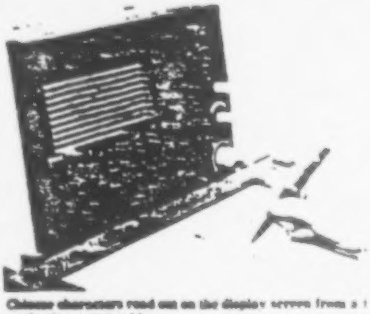


Chinese characters read out on the display screen from a 1
read-only memory chip.

TECHNOLO

Sanyo pr
TV set u

Sanyo Electric Co
nounced development
ultra thin television
with an light-emitting
(LED) display repla
conventional picture tu
only 6 millimeters thick

The screen, measurin
millimeters, is a lattice
green color LED el
each of which emit
corresponding to the
length of image sig
receives.

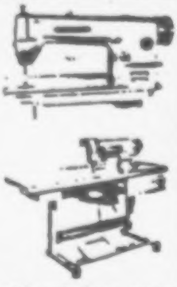
Mainly because of a
developed light ref
installed at the back
element, the screen
bright as ordinary
tubes, Sanyo says.

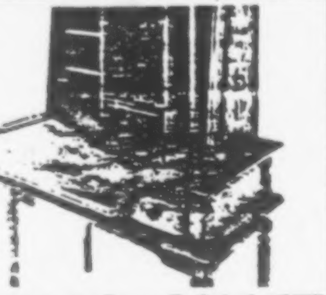
The Osaka company
commercialize th
white TV with the

New Products

Sony Corp. of Kitashinagawa 6-chome, 7-35, Shinagawa-ku, Tokyo has developed a compact, lightweight color video camera and a home portable video recorder. The HVC-1100 camera, with a triple magnification zoom lens, uses a single image tube and a 2/3-inch MF Trinicon. Its main unit, including a camera control unit, zoom lens and remote-controlled grip, weighs 2.2 kg. When combined with the portable video recorder and a special battery pack, the camera is only about 10 kg, according to Sony. Equipped with an optical finder and a white balance meter, the camera is as handy as an 8-mm camera, Sony says. The SL-3100 portable VTR weighs 6.5 kg. Its new ICs provide for clearer images. Price: ¥269,000 ($1,230) for the former and ¥249,000 ($1,140) for the latter.

Mitsubishi Electric Corp. of 2-3, Marunouchi 2-chome, Chiyoda-ku, Tokyo has developed two new types of industrial sewing machines — a high-speed single-needle automatic oiling model (DB-130E, shown above) and a double-needle corner-sewing model (DN-275A). The DB-130E model features soft and clean stitching regardless of fabric thickness. Oiling of the cam is attained automatically even at low speed with the help of a fine-tunable screw. The DN-275A model has two needles which move independently. In corner sewing, either of them automatically stops to let the other turn the corner. The period of stoppage is digitally programmable beforehand with use of a built-in electronic controlling unit. Price: ¥72,000-93,000 ($330-420) for the DB-130E model and ¥620,000-660,000 ($2,900-3,000) for the DN-275A model.





A new [illegible] sheet that offers a quality of natural wood grain
[illegible]

Hitachi secures advanced satell
remote sensing tech. from TRW

Hitachi, Ltd. has introduced an advanced satellite remote sensing technique from TRW, Inc. of the U.S. They recently concluded a technology introduction contract.

The technique is the software to process, analyze and store data transmitted to the earth by satellites.

Hitachi will be the first Japanese company to undertake remote sensing. It will apply the software to large HITAC computers to be installed at the [illegible]

American technique
Hitachi and started
phase to developm
peripheral hardware
introduced technique
core.

Demand for satellite
sensing is expected
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Large-scale integration (LSI) memory chips of MOS RAM (metal oxide semiconductor, random access memory) type having 64 K (or 65,536) bit capacity, by far the most capable of their kind, lately are being developed in a rapid succession in Japan, the U.S. and West Germany.

Although the LSI memory devices for computers have their home in the U.S., non-profit Japanese public telecommunications service and electronic products makers have been the first in the world to develop the new 64 K bit memory chip.

This is a summary of an 8-page article in the May 15, 1978 issue of The Nikkei Electronics, a bi-weekly Japanese language magazine published by Nikkei-McGraw-Hill, Inc.

The Japanese trail-blazers are Musashino Electrical Communication Laboratory of Nippon Telegraph & Telephone Public Corporation, Nippon Electric Co., Fujitsu Ltd., Hitachi, Ltd. and Tokyo Shibaura Electric Co. (Toshiba).

They thus are taking the technological lead in the world's efforts to create such high capacity memory devices.

The laboratory developed, jointly with Nippon Electric, Fujitsu and Hitachi, the very first model of the 64 K bit MOS RAM chip during April, last year. Toshiba followed with its own model earlier this year.

Technologically, the Japanese thus have started running ahead of even the most advanced American LSI industry in development of the new high capacity memory chips.

But marketability of the new Japanese product is another story. In the first place, standardization is a prerequisite to development of wide demands for new products.

There must be many producers capable of supplying such memory devices of certain standard specifications to meet the needs of a great many users.

This question of standardization has to be considered in connection with the American LSI memory market, the largest in the world.

Every attempt to market such new product must start there, and rival American LSI memory makers will doubtlessly compete actively with such pioneering Japanese developers. West German equivalents are also expected to join the competition.

Standardization sought

The first MOS RAM chip of 1 K (1,024) bits was developed in 1970 by Intel Corp. of the U.S. Two years later or in 1972, the corporation came up with a new 4 K (4,096) bit model. By that time, Texas Instruments Inc., an electronics giant of the U.S., has already been in the lead in commercialization of such memory chips.

By 1976, Mostek Corp., also of the U.S., captured the leadership of the U.S. market for such memory chips with its 16 K (16,384) bit model.

The Japanese success in developing the 64 K bit type means a 64-time expansion of the capacity of such memory chips in just eight years since their inception.

At present, the 16 K bit memory chips are becoming the leader of all such memory devices on the U.S. market.

But they are in short supply because there are only several makers capable of producing them in constant volumes, and just two or three in case of the 150 nanoseconds access time type.

As things now stand, the four Japanese electronics companies developing the new high-capacity type expect to make some changes in designing of their new products before starting to market their new products in the U.S.

Their American counterparts, including Intel and Fairchild Camera & Instrument Corp., are said to have already developed their own 64 K bit versions.

American Micro-Systems Inc. (AMI) and Siemens A.G. of West Germany reportedly have developed their own of a different VMOS design (with a V-shaped MOS gate). But their versions are also believed to be essentially the same as the Japanese in characteristics.

The Japanese believe it will take at least two or three years, that is, until 1980 or 1981 before their products start finding demand on the U.S. market.

Technological challenges

Besides, they are well aware of the need for making their new products as interchangeable as possible with the already commercialized 16 K bit type to save customers the expensive trouble of large-scale remodelling of their computers or other facilities using the 16 K bit type.

To cite various technological adaptation efforts made by the Japanese 64 K memory chip developers to make their new products match the 16 K bit type as far as possible, the number of pins has been kept at 16, the same as the 16 K bit type, and the address and other signal pulses have been also made identical as the latter's. The access time has been adjusted to around 150 ns., just a little more.

Besides this, each chip has been limited in size to a maximum of between 20 and 25 square millimeters, nearly the same as the 16 K bit type.

Such a limitation in chip size in contrast to the quadrupling of the memory capacity without any structural change from the 16 K bit type's 16-pin, double polycrystalline silicon gate and one-transistor-cell naturally has required much

(Continued on Page 18)

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RTRL TUESDAY, MAY 30, 1978

64 K MOS RAM area —

(Continued from Page 8)

narrowing down of the circuit line width, such as from 4 to 6 microns of the 16 K bit type to 2 to 4 microns, and corresponding miniaturization of the memory cells.

This, in turn, has given rise to various technological problems, including too high supply voltages and too much thickness of the gate oxide.

The telecommunications corporation laboratory thus has lowered the voltage to 7 volts and the oxide thickness to 30 nanometers (compared with 12 volts and 100 nanometers of the 16 K bit type). It has also applied molybdenum to circuit wiring to better electric current flows and arsenic to source and drain dopings to help miniaturization.

But recently a new roadblock has been set up in the way of such 64 K bit memory device development drives, as if to slow down all such Japanese or other efforts, by Mostek Corp. with its announcement that no good 64 K bit type with acceptable merits can be expected unless run by a plus 5-volt single power supply and speeded up to 50 to 150 ns in access time.

The Japanese developers have so far used two power supplies of plus 7 or 8 volts and minus 2 volts and set a minimum of 150 ns access time. To use a single power supply and to speed up the access time further are still a difficult technological challenge.

If standardization according to Mostek's demand is required, the Japanese fear one or two more years of delay in commercialization of their new products.

may not reach voluntary quota

Japanese color TV manufacturers likely will fail to attain the volume of exports to the U.S. set on the basis of the orderly marketing agreement between the Japanese and U.S. governments, in the current year ending next June.

Under the agreement, Japanese color TV makers are obliged voluntarily to restrain their exports to the U.S. to 1,750,000 units yearly — 1,560,000 assembled sets and 190,000 semi-finished sets — over the three years starting July, 1977.

In the first year of voluntary restraint that ended in June, the Japanese manufacturers attained the set volume exactly, pleasing both the Ministry of International Trade & Industry here and the U.S. government and industry circles.

However, they feel it will be difficult for them to attain the voluntary quota in the current year because of the sharply rising yen's appreciation. The prospect has worsened since the yen exchange rate against the dollar rose to break the ¥190 level last week.

In order to meet the yen's appreciation, Japanese manufacturers have been compelled greatly to raise their retail prices on the U.S. market.

The retail prices for Japanese 19- and 13-inch color TVs on the U.S. market reportedly surpassed their American counterparts as of last June, meaning that Japanese color TVs have been losing price competitiveness on the U.S. market and, accordingly, their sales have begun to slow down.

Sales are expected further to drop from now because Japanese manufacturers need to raise their retail prices in the U.S. by around 10 per cent to meet the soaring of the yen exchange rate in the past month.

Toshiba Corp. says it will become difficult for it to attain its volume of exports to the U.S., if the high yen persists.

Hitachi, Ltd. also says it will be inevitable for it to greatly hike its retail prices in the U.S., suggesting the increasing difficulty to attain its planned volume of exports to the U.S.

Japanese manufacturers thus have begun to seek new measures to meet the yen's appreciation. First of all, they have begun to improve their product mixes for sales in the U.S., such as by switching to larger, high-grade color TVs.

Toshiba is considering holding down shipments from Japan to the U.S. and in turn boosting production in the U.S. as a way to meet the yen's appreciation.

Some other manufacturers also are intending to boost shipments from their subsidiaries in third countries, such as Taiwan, to the U.S. to skirt exchange losses.

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Two key feat system are a sample switchin

Big semiconductor makers are actively expanding prod. setups

Six major Japanese semiconductor makers have been aggressively expanding their production facilities and building new plants in sharp contrast to the general industry trend to hold down plant and equipment investments in fear of uncertain prospects of the future.

Fujitsu Limited, a computer maker which started marketing semiconductors only last year, is the most active among them. It is now building a semiconductor manufacturing plant at about ¥5 billion.

Capital spending is centered primarily on automatization of integrated circuit manufacturing facilities and streamlining of other production facilities.

Purchase of electron-beam exposure equipment for commercialization of very large-scale integrations (LSIs) in the future is conspicuous. All the semiconductor makers are boosting facilities or building new facilities for metal oxide semiconductor (MOS)-LSI production to capitalize on the explosive demand for such devices for application to microcomputers and computer memories.

As demand for ICs has been expanding at a pace far faster than earlier expected, some of the semiconductor makers will make additional plant and equipment investments in the second half of fiscal 1978 ending next March.

The six leading IC makers each have been making a ¥5-10 billion capital spending yearly for expansion of their IC divisions for the past several years.

Rapid progress in semiconductor technology and fast popularization of new products are forcing these makers constantly to make plant and equipment investments.

Nippon Electric Co., Japan's top IC producer, plans to spend ¥10 billion this year for its semiconductor division. Of them, ¥9 billion will be spent for automatization of IC production facilities.

Toshiba Corp., which spent ¥12 billion in fiscal 1976 for its semiconductor division, last year held down such spending to ¥5 billion. It will not boost the spending this year but try to make the division profitable. Toshiba's semiconductor division incurred a loss last year.

Matsushita Electronics Corp. has purchased two electron beam exposure equipment from JEOL, Ltd. in an attempt to commercialize VLSIs on its own. Mitsubishi Electric Corp. is going to follow suit.

Hitachi, Ltd., which has done poor IC business until last spring, is trying to boost MOS-LSI production capacities to mass produce computer memories.

Plant & Equipment Investment Program of Semiconductor Division in Fiscal 1978

(Survey as of June end)

	Fiscal 1978 (planned, ¥ million)		Fiscal 1977 (actual, ¥ million)
Nippon Electric	10,000	(40%)	9,000
Hitachi, Ltd.	7,000	(16%)	6,000
Toshiba	5,000	(15%)	5,000
Mitsubishi Electric	6,000	(25%)	4,000
Matsushita Electronics	4,000	(20%)	2,000
Fujitsu	9,000	(40%)	6,000

Note: Share of semiconductor division's capital spending to total plant and equipment investments is shown in parentheses.

THE 11TH ANNUAL

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As to reducing tariffs for the U.S. by 36 per cent, it is understood that the margin of cut by the U.S. for Japan will be 45 per cent, and that the margin of cut by Japan for EC will be 40 per cent.

This means that Japan is intending to make a big tariff concession to the U.S. as to industrial products.

Some within the Japanese Government thus feel there is a good chance of Japan reaching an accord with the U.S. in this province.

However, opinion also is strong that this does not necessarily mean that a Japan-U.S. "front" thereby can be readily cemented for working on EC.

As to this, it is noted that Strauss, evincing dissatisfaction over Japan's attitude as to oranges and beef, some time ago remarked that chances of the Tokyo Round making considerable progress before the summit talks looked slim.

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The Ministry of Finance views use of the CD system in Japan with importance in considering the following developments:

—Enterprises have begun to possess a large amount of excess money with no proper

MITI will relax guidance against computer makers

The Ministry of International Trade & Industry is going to ease its administrative guidance of computer makers—giving them a freer hand—to mitigate growing foreign criticism that Japan is propelling computer development on a "national policy basis."

Up to now, MITI has undertaken strong computer development promotion guidance, centering on having makers form groups and extending subsidies, with the aim of raising the level of Japanese computers to those of International Business Machines Corp. and other U.S. makers.

However, since "national policy" charges have increased against such guidance, MITI has decided to alter its future policy as to development of the operating system for future computers to indirect assistance of individual makers.

Such a policy change implies also that domestic makers will have to strive actively to stand on their own feet and be placed in the position of having to compete fully with their rivals as to product superiority.

The future system which the Japanese makers now are striving to develop is one for competing against a fourth generation type system which IBM is expected to market in and after 1980.

Commercializing this future system is estimated to cost the domestic computer industry anywhere from ¥200-250 billion in development costs.

Since this naturally cannot

to the view that it should revise its past aggressive guidance policy, such as compelling makers to form groups and offering financial help from such standpoint.

It feels it now has to change its administrative guidance to a "mild" form in keeping with the spirit of the new emergency law for promoting

(Continued on Page 17)

Current account surplus in May fell

The surplus of the current account of the balance of payments in May decreased greatly.

This was bared by the Ministry of Finance and the Bank of Japan last week in their "final report."

The surplus of the current account was reported to have fallen to $720 million (¥167.3 billion in yen terms) as the black of the trade account diminished from a sharp increase in crude oil imports.

This figure is a big comedown from the surplus of $1,740 million recorded in April.

The overall account scored a $113 million red (¥25.6 billion), owing to the all-time high net outflow in dollars (deficit) recorded by the long-term capital account.

It was the first time since October, 1976 for the overall account to chalk up deficit, excluding that for the month of January which seasonally always scores a red.

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Computer —

(Continued from Page 2)

specific types of machines and the information industry, allow individual computer companies themselves to determine the direction of their operating system, and avoid financial subsidies to skirt foreign criticism.

While it still needs to work out concrete steps, the Ministry is intending to have aid take a more indirect form as allowing the Japan Development Bank to offer low interest loans to makers and according beneficial tax treatment to makers' expenditure for operating system development.

Electrical Communication Laboratories
—Recent LSI Activities—

By Makoto Watanabe

Musashino Electrical Communication Laboratory, NTT

Electrical Communication Laboratories has been the center of research and developmental activities for NTT since 1952. In this article, the activities of ECL will be reviewed with particular emphasis on large scale integrated circuits, namely, the history of semiconductor study, LSI applications in communication systems and recent achievements by the Laboratories in this field.

1. Role of Electrical Communication Laboratories

Electrical Communication Laboratories has been the center of research and developmental activities for Nippon Telegraph and Telephone Public Corp. since 1952. The Laboratories originate from the Electrotechnical Laboratory in the Ministry of Communication. It was divided into two Laboratories, namely its successor and Electrical Communication Laboratory, or ECL, in 1948. As an integral part of NTT head office, as shown in Fig. 1, ECL has been active in R and D activities in all fields where telecommunication systems are concerned. Today, it consists of one bureau and three laboratories, namely, Research and Development Bureau and the Musashino, Yokosuka and Ibaraki Laboratories.

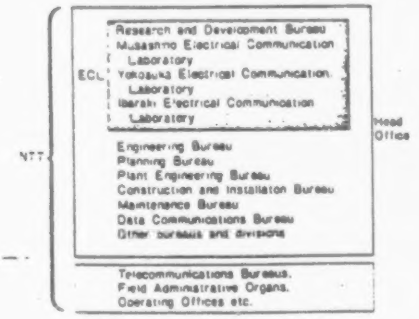

NTT
ECL
Research and Development Bureau
Musashino Electrical Communication Laboratory
Yokosuka Electrical Communication Laboratory
Ibaraki Electrical Communication Laboratory
Head Office
Engineering Bureau
Planning Bureau
Plant Engineering Bureau
Construction and Installation Bureau
Maintenance Bureau
Data Communications Bureau
Other bureaus and divisions
Telecommunications Bureaus,
Field Administrative Organs,
Operating Offices etc.

Figure 1. NTT head office organization

The activities of the Laboratories have been widely extended to cover the whole spectrum of NTT services, and could be categorized in the following.

(a) Electronic switching system
(b) Information processing system
(c) Video communication system
(d) New transmission system
(e) Information terminal devices
(f) Components and materials

Together with these developmental activities, fundamental research is being carried out extensively. Also, ECLs comply with requests from operating offices for assistance on technical problems in existing systems.

In these past few years, emphasis was put onto the following three subjects, each of which is expected to have significant effect on future communication systems.

(a) Digital communication network
(b) Optical fiber cable transmission system
(c) Very large scale integrated circuits

The digital communication network is intended to build networks, taking full advantage of digital system merits. By virtue of its integrity, versatility and flexibility, the digital network is expected to provide better services in response to customer needs on telephone, data, facsimile, and so on.

The optical transmission system is now under development, where optical fiber cables serve as a new media for signal transmission. The system consists of fiber cable, semiconductor light source and detector. The optical transmission system would be applied in various fields in the networks in near future.

Large scale integrated circuits are key components in future communication systems. A project is now being carried out to develop LSIs to meet future system requirements and to establish basic technologies to make them.

As the result of concentrated activities on the three projects mentioned above, many achievements have been accomplished in the Laboratories. In this issue, the third subject, namely, the LSI project will be focused upon to give a closer look at the Laboratories developmental activities. The past activities of the Laboratories on semiconductor devices will be reviewed, then, the application of LSIs on communication systems will be discussed, and finally, recent achievements will be shown.

2. Past R & D Activities on Semiconductor Devices

The Laboratories have a long history on semiconductor research and development. The study on semiconductor material and devices started in 1949 in the Laboratory. As a result, a germanium point contact transistor, the first one made in this country, was fabricated in 1952 (Fig. 2). Although the transistor was not put to practical use, it opened a new era of solid state devices. Thus, the Laboratory established a land mark in the history of semiconductor research in Japan.

As time went on, the R & D objectives in the Laboratory moved from point contact type to germanium alloy, mesa, then silicon mesa and planar transistors. The circuit and system studies using solid state devices were also active in accordance with the development of transistors. For example, a study on a short-haul carrier transmission system, utilizing germanium alloy transistors, was started in 1955.

In the early 60's, developmental work was focused onto high frequency transistors for carrier transmission systems. The bandwidth of the carrier transmission system using transistors was limited to several tens of kilo Hertz in its early stage. Today, systems with 60 MHz bandwidth or 400 Mb/s bit rate are in commercial service. The dramatic increase in bandwidth is primarily due to the improvement in transistor performance.

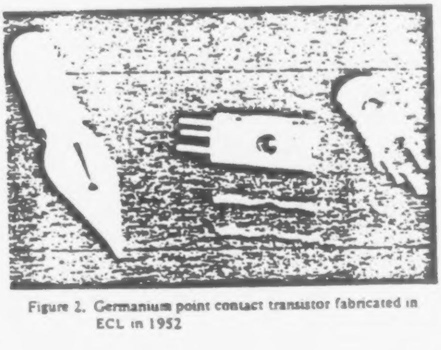


Figure 2. Germanium point contact transistor fabricated in ECL in 1952

Study on the electronic switching system started in the late 60's. At first, it was planned to build the system using silicon transistors. The long term stability as well as economization of transistors were extensively studied for the purpose. On the other hand, the study on integrated circuits for use in the system was started in 1965, in parallel with transistor study, as, although in its early stage, integrated circuits were deemed quite promising for that usage. The project design objective was to develop an IC family to satisfy system demands without loosing the IC's versatility. Finally, an integrated logic family, called Controlled Saturation Logic or CSL, was developed. The CSL has been the main logic used in the D10 electronic switching system, a standard NTT large scale office use system, since then, and has proved its high performance and excellent reliability of around 1 ~ 2 Fits per package.

A study of Large Scale Integrated circuit or LSI started in 1968. A logic circuit, called NTL or Non Threshold Logic, had been developed. NTL features low power dissipation, high speed and simple circuit configuration suited for LSIs. It has recently been adopted for DC-400M (PCM) system by virtue of its high speed and low power.

In the semiconductor memory field, the LSI has actively been studied for introduction into communication systems. In 1971, a prototype of a memory system.

Table 1. Semiconductor Memory Development in the Laboratories

	(46 ICTM)	D-20	DIPS-II			D-10	D-10 HCP
			10	20	30		
Device	1K (p)	1K	4K	4K	2K*	4K	4K
Ta/Tc (μs)	0.6/1	0.5/1	0.65/ 0.72	0.46/ 0.5	0.24/ 0.3	0.6/1.2	0.24/ 0.36
Capacity (bit)	10^6	1.4×10^8	10^9	10^9	10^7	10^6	10^6
FIT Rate (10^6)	46	6	30	30	20	16	14
Power (W)	170	34	1.500	2.100	4.500	50	120
Date	1971	1973	1975	1975	1976	1976	1977

* 1K × 2

using 1 kb dynamic MOS, was built to prove the feasibility of semiconductor RAMs as a replacement for conventional magnetic core memory. The system was proved sound from reliability and economy viewpoints. As a result, a 1 kb per chip dynamic MOS memory and, later, of 4 kb per chip, has been introduced into D20 and D10 electronic switching systems and DIPS 11 information processing systems. The work has pioneered the use of MOS dynamic memory into large scale systems. Table 1 shows the history of development on semiconductor memory systems in the Laboratories.

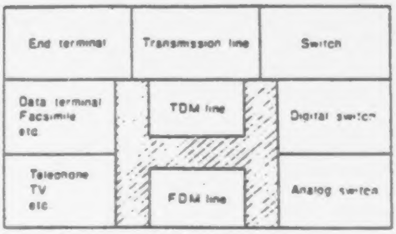
3. LSI in Communication Systems

3.1 Past and Present Status of Electronic Circuits

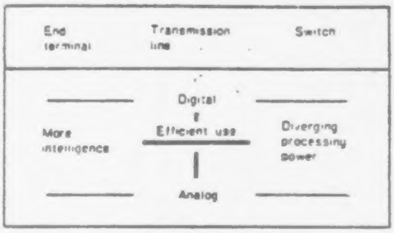
Electronic circuits had only limited applications in the telecommunication systems until ten years ago, when the electronic switching system was introduced to take advantage of modern solid state electronic devices. In the D10 system mentioned previously, 78,000 logic gates and 13 Mega bit memory were employed to handle calls by 40,000 telephone subscribers on an average. That means each subscriber line shares 2 gates and 300 bits of electronic circuits in the central processor. In the infancy of integrated circuits, this was a typical situation for a communication system in the use of electronic circuits.

Thanks to the innovation of solid state technologies, ICs and then LSIs have become prevalent in the systems since then. A subscriber in a small scale switching system, or EPAX, shares an increasing number of electronic circuits. Most of the data communication terminals recently developed use many ICs. When the terminal is connected to the data networks through an HDLC interface, several thousand gates are needed in it. This is the situation typical today, in the era of LSIs. It is to be noted that the dramatic increase in the number of electronic circuit per subscriber line in these ten years roughly coincides with the inverse of price reduction in electronic circuit during the same period.

When the tendency is extrapolated into the future, a subscriber line can be expected to be equipped with some thousand gates, which could have potential power to change the structure of communication systems significantly. More detailed analysis in the following section on the individual application field for LSIs would clarify the feasibility of using LSIs in the system.



(a) Functions



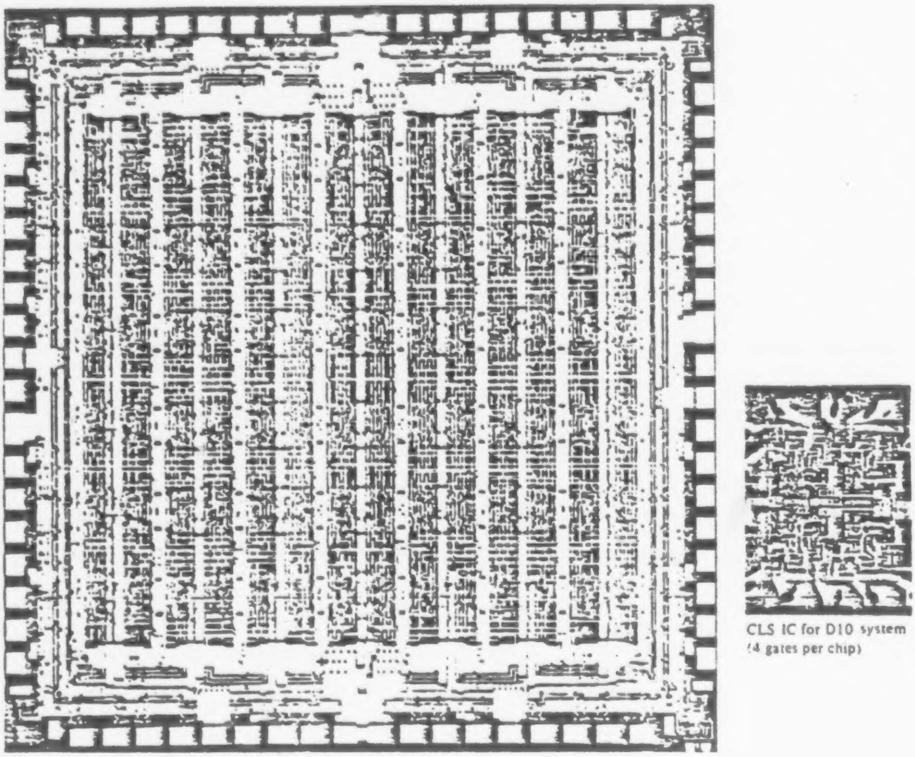
(b) Impact of LSI

Figure 3. Communication system classified functions and LSI impact in the system

3.2 LSI in Switching Systems

As shown in Fig. 3, communication systems are generally composed of three different functional blocks, namely, end terminal, transmission line and switch. The switch part was the first to utilize electronic circuits on a large scale. In the D10 system, electronic circuits control the speech path made up through electro-mechanical switches. In the next generation switch, the speech path might also be made of electronic circuits, so that the use of LSIs would be enhanced in the future system. The need for improved call handling capability also accelerates the use of high performance LSIs.

Figure 4 shows two types of integrated circuit: the CSL for D10 system, developed ten years ago, and the LSI, recently developed for high speed central processor. The former has two gates in it with gate delay time of 7 nano seconds. The later has 200 gates of 2 nano second delay. Both of these devices are bipolar type. They clearly show the progress in semiconductor technology in these past ten years. Bipolar LSIs would still continue to survive for high speed applications. On the other hand, MOS LSIs would be used where cost per performance is of prime importance, like small scale switching systems and controllers. The performance of MOS is improving with the progress in microfabrication technologies, so that it would not be long before the majority of bipolar devices will be taken over by MOSs. For the switching system memory, MOS memories have been employed and will be used in future. The sacle of the memory is going to inflate to accommodate sophisticated and ever



CLS IC for D10 system (4 gates per chip)

Master slice LSI for high speed central processor (200 gates per chip)

Figure 4. Comparison of two chip types used in the switching system showing the progress in the past decade

increasing programs of switching systems. The memory can best be realized with improved MOS technologies, which brings in an improved integration density, higher speed and lower dissipation power, as well as better cost performance ratio. Figure 5 shows newly developed 64 k bit dynamic MOS memory.

3.3 LSI in End Terminals

For end terminals, more electronic circuits are needed in accordance with the sophistication of their functions. Hybrid integrated tone generator for the pushbutton telephone set was the first integrated circuit of this kind. Other end terminal devices, like facsimile, data terminals, etc..including MODEMs or interface circuits, necessitates much more electronic circuits than telephone sets. These are the major application area of LSIs. However, quite obviously, requirements for cost reduction are quite

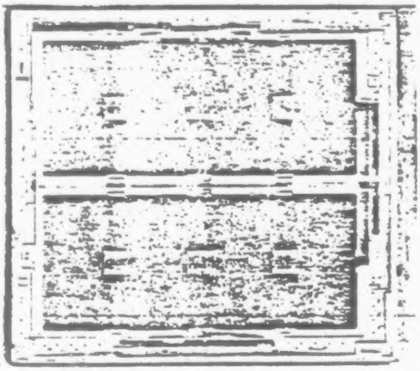


Figure 5. Top view of 64 kb random access memory chip

stringent in this field. MOS LSIs, because of their simple structure, limited performance, low power and flexibility in design, seem promising in these end terminal applications.

3.4 LSI for Digital Networks

The digital transmission line and digital network in its extended form would be the most important application of LSIs in the communication system. As LSIs are able to convert analog signals to digital and vice versa, to store, multiply, shift and filter digital signals with ease, an integrated digital system with flexibility and versatility could only be built by utilizing LSIs. The basic functions of digital transmission terminals could be composed of several functional LSIs, as shown in Fig. 6. MOS LSIs, including CMOS, are suited for those usages, because of low power as well as wide operating range in temperature and source voltage.

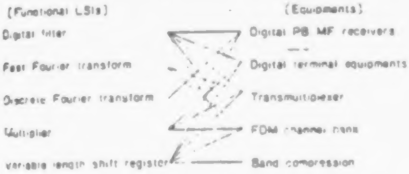


Figure 6. Functional LSIs as building blocks in digital signal processing equipments

The applications and features of LSIs hitherto described are listed in Table 2. Various types of LSIs, from high speed bipolar to low speeed MOS, are needed in the system. Their functions include logic, memory, analog, digital and conversion between them. A wide spectrum in R and D activities is required to meet future system needs with regard to LSIs.

Table 2. LSI Applications and Features

Applications	Features	Device
LSIs for Central Processors	High performance logic Large capacity memory	Bipolar MOS
LSIs for Terminals	Small size, low power, low cost	MOS
LSIs for Digital Networks LSIs for Signal Processing	High performance Low power consumption	MOS CMOS

4. LSI Project

Viewing the future potential of LSIs in communication systems, the Laboratories started their own three year LSI project in early 1975. The development of LSIs requires an integration of activities from material, to process, to circuit and system. Five developmental divisions in the three Laboratories were incorporated in carrying out the project. The key technology in making LSIs is the microfabrication process. Therefore, efforts were focused on process development, including the development of electron beam and X-ray exposure systems. A device development target was set for each type of device. Some examples are shown in Table 3. Individual processing machines and processes aim at one micron feature dimension, while devices are expected to be completed by using two micron design rule. A 64 kbit MOS memory was chosen as a carrying vehicle for the new process technologies.

Table 3. Temporary LSI Project Targets

NMOS Memory	64 kb, ta 300ns
Full Wafer Memory	0.5 ~ 1Mb, ta 1μs
Bipolar Memory	1 ~ 2 kb, ta 20ns
Bipolar Logic	1 kgate, tpd 0.5ns
CMOS Logic	4 kgates, tpd 5 ~ 10ns

In early 1978, most of the initial targets were achieved as scheduled. Table 4 lists the LSIs already developed or in the final stage of development. Table 5 also shows LSIs completed in the Laboratory and going to be applied

Table 4. Example of Devices in Developmental Stage

Device	Specification	Application System
NMOS Memory	4 kb, ta 300 ns 4 kb, ta 200 ns 4 kb, ta 100 ns	D-10 DIPS-11 High speed processor for D-10
Bipolar Logic	200 gate, tpd 2ns Toggle freq., 1 GHz	High speed processor for D-10 DC-400M (PCM-400M)
Image Sensor	2,000 picture elements	Facsimile
NMOS Memory	16 kb, ta 250 ns 16 kb, ta 120 ns	D-20 DIPS-11

Table 5. Device Examples in Research

Device	Specification	Application Field
NMOS Memory	64 kb, ta 200 ns 128 kb, ROM 256 kb, full wafer	Electronic switching system
CCD Memory	64 kb, data rate 3.4 Mbit/s	Data communication system
Bipolar Memory	1 kb, ta 7.5ns	Digital switching system
Bipolar Logic	200 gate, tpd 0.1ns	Digital signal processing
Microprocessor	8 bit slice emitter coupled logic (1.5kg)	Video communication
CMOS Logic	16 bit multiplier	Mobile communication

in the system in the near future.

The 64 kbit MOS memory, the highest integration density in the world, was fabricated in the newly built clean-room facility at Musashino Laboratory in 1977, one year earlier than expected. Recently, a 128 kbit MOS Read Only Memory was also made, as shown in the frontispiece.

In bipolar devices, 200 gate LSIs are already in practical use, and 1,600 gate high density logic, ultra high speed logic of 0.1 nano second and 7.5 nano second 1 kb memory were completed in the Laboratory.

CMOS 16 bit multiplier was also fabricated for use in digital signal processing. Other devices for digital systems are now under development.

Electron beam and X-ray exposure machines were also developed. Both of them are able to print extremely fine patterns of one micron dimension. For materials and processes, 5 inch dislocation free silicon crystal, sensitive resist material for both electron beam and X-ray, thin gate oxide film free from pin-holes and related processes needed for short channel MOS, have been extensively studied. The 64 kbit MOS memory previously mentioned was fabricated as the result of integrated developmental work on materials and processing technologies as well as novel circuit and pattern design techniques in the Laboratories.

The LSI technologies and devices studied and developed in these three years are satisfactory as the first step toward future LSIs. As the next step, extensive efforts are now being carried out for research and development as well as fundamental studies on LSIs.

5. Conclusions

The impact of Large Scale Integrated circuits on communication systems was studied and some recent activities by the Laboratories on LSIs reviewed. As LSIs are expected to have significant effect on communication systems, the Laboratories have intensified research and developmental activities on LSI devices and its fabrication technologies since 1975. Some of the devices developed have already been put into practical systems. Further developmental efforts will continue toward future systems to make full use of the advantages of LSIs.

Reference

(1) H. Toyoda, A. Kawamata, M. Watanabe and T. Hayashi: "Research and Development on LSI in Electrical Communication Laboratories", Review of ECL, 27, Jan./Feb. 1979.

Note: Figures and Tables originate from Reference (1).

NIHON KEIZAI
January 23, 1980
(Page 8) (Full)

US SIA Proposes to Japan Joint Research on Trend of Semi-Conductor Market

The SIA [US Semi-Conductor Industry Association; Cupachino (TN: phonetic) California], which is the central organization in the US semi-conductor industry circles, proposed to Japanese industry circles that they take joint steps in statistics and research concerning the world market for semi-conductors, centering on IC's (integrated circuits) and LSI's large-scale integrated circuits). The Japan Electronic Machine Industry circles, which received this proposal, intend to "check into it in a forward-looking way" (Managing Director Toshio TAKAI). Persons connected with the industry circles, including those in Japan, the US, and Europe, are scheduled to start talks on the concrete method of market research in the near future. The SIA has so far been refusing to hold talks with Japanese semi-conductor industry circles. It is possible to expect that exchange between the two countries will be started, with this proposal as an opportunity, and this is likely to become a clue to easing the semi-conductor friction between Japan and the US.

This was clarified on the 22nd by SIA Managing Director Thomas D. Hinkelman (TN: phonetic), who is visiting Japan. It is a plan for industry circles in Japan, the US and Europe to sum up jointly the trends of the markets for semi-conductor materials, including silicon wafer, and semiconductor products. In concrete terms, semi-conductors will be roughly classified into discrete (individual semiconductors) and IC's, and IC's will be finely classified into MOS (metal oxide semi-conductor) IC's and bipolar IC's. Thus, a table of statistical research on a global scale, centering on the three big markets -- Japan, the US, and Europe -- will be prepared as to two points -- the amount of shipment and the amount of consumption.

According to the said Managing Director, preliminary talks, consisting of persons connected with semiconductor industry circles of Japan, the US, and Europe, are scheduled to be held within two or three months to check into the contents and method of research. Within one or two years after that, a research report will be compiled, and after that, permanent statistical research will be conducted to make public research results at the rate of once a month.

The proposal this time is designed "for various semi-conductor manufacturers of Japan, the US, and Europe to grasp the trend of demand so that they can form precise management strategy" (Managing Director HINKELMAN). This will be the first time for industry circles of Japan, the US, and Europe to start market research jointly. It is said that European semi-conductor manufacturers have already accepted the SIA proposal. The policy of the Japan Electronic Machine Industry association is to hold a meeting of the Electron Tube and Semi-Conductor Committee, which consists of Japanese semi-conductor manufacturers, as early as within this month, and decide on arrangements for the future without delay.

So far, SIA has been developing activities to criticize Japan because of the rapid increase in the import of Japanese semi-conductors, and it has been refusing to carry out not only dialogues with Japan but also operations to co-ordinate statistical figures on such matters as exports and imports, which figures have been different between Japan and the US. The proposal this time is for mere market research activities, but it shows the SIA moves to take joint steps with the Japanese side, and it can be said to be a step forward, in the sense of Japan-US exchange.

KEIZAI SANGYO
February 8, 1980

"Responding to Criticism of the Closed Nature, Complete Opening of Super LSI Patents of NTT

NTT has agreed to the overall opening up of super LSI patents on which it has been jointly conducting R&D with 3 communication machinery manufacturers (NEC, Fujitsu, Hitachi). This is in response to the government's decision at the end of last year to open completely the patents of the VLSI Association. As a result the Japanese VLSI patents were completely opened.

NTT further made clear its policy not to limit its joint research to these three communication machinery manufacturers in the future. These decisions by NTT were designed to display a forward-looking posture in response to criticisms of closedness, and also to display self-confidence concerning VLSI technology.

NTT's VLSI research and development began in the 1970s. It was undertaken in anticipation of development of the electronics technology of the 1980s, which is known as the "age of VLSI." In conjunction with the 3 communication machinery companies, the research in tandem with the 3 companies produced results and advanced the development of the NTT group. The first plan (1975-77) was soon to be labeled the "Entrance Gate to VLSIs," and the 64K-bit LSI, in which 10-15 thousand elements are placed on a chip several centimeters square.

From 1978, a second 3-year project in which 200 million yen was invested was started, and this recently resulted in the successful development of a 256-bit RAM, a literally super-LSI on which about 60,000 elements were placed on a silicon chip. Although it is claimed that the U.S.'s IBM is said to have succeeded in developing this 256-bit super LSI, which is being researched and developed vigorously by the computer and semiconductor makers of the world, the details of its contents have never been made clear.

Thus NTT's achievement was epochal. NTT's development power can be said to have reached the world class level, comparable to that of IBM. The fact that this leading edge technology, which was achieved together with the VLSI Association, created by dint of the sweat of MITI, was opened up to enterprises at home and abroad makes this decision a noteworthy one.

The advanced countries of the world are engaged in a severe competition in the development of super LSIs, and the competition is particularly fierce between the leader, the U.S., and the pursuing competitor, Japan. In the last year or two, the anti-Japanese criticism of the U.S. semiconductor and computer industry has been mounting, and in particular the arrows have been concentrated on Japan's "government-civilian unified research structure."

This action, in which the government and NTT opened up patents across the board was taken in response to this criticism. It can be said that this action provided helpful material to relax the U.S.-Japan trade frictions which with autos, steel and semiconductors as fuel, was about to explode.

Further, this action by NTT served to provide a forward-looking positive image in response to the criticisms of "closedness." At present the question of NTT's closed door policy is being negotiated at the political level between the U.S. and Japan. The U.S. wants to sell products to NTT, but also desires to participate in NTT's R&D activities. This is a tactic which involves absorbing the high level of technology of NTT and turning this into products which will then be sold to the agency ("eat into agency"). This being the case, is a strong possibility that the opening up of NTT patents will be followed up strongly. And thus, the action of NTT may be said also to have the aim of countering in advance such demands by the U.S.

Also, the new look at the VLSI development structure can be said to have been good news for the semiconductor and computer makers outside of the NTT family. For example, there is the case of an important member of the NTT family, Oki Electric Company, dropping out of the joint R&D structure in 1975 with "the low technological level" as its reason.

Subsequently, things were somewhat patched up by NTT's releasing 64 bit memory technology to that company alone, but, even now, it is complaining that the influence of being eliminated from the NTT group is immeasurable. This kind of frantic activity (feeling upset), (anxiety) exists among companies outside of the family, such as Matsushita, Mitsubishi, Toshiba, who are seeking somehow to get into NTT's tight VLSI development structure, which comprises NEC, Hitachi, Fujitsu, and absorb the technology of the agency, and want to sell products which utilize technology produced by the family. These were the desires of the large semiconductor/computer makers.

NTT has thus by those measures made available to these firms a way to participate in the joint research. The three communications makers are making whining noises with respect to the new policy of NTT to the effect that "up to now there has been a completely open exchange of know-how in our joint research, but with new participants, there is a danger that the know-how will be drained away. Hence, in the future, there is likely to be an interesting rivalry between the original 3 and the newcomers.

NIHON KEIZAI
February 16, 1980
(Page 7) (Full)

Growing Japan-US Competition for Development of VLSI; Japanese Manufacturers Developing New Techniques in Succession; Indigenous Technology Rumored to "Have Surpassed American Level"

The technological level among the Japanese manufacturers of very large-scale integrated circuits (VLSI) is rising rapidly. Recently, Nippon Telegraph and Telephone Public Corporation (NTT), the Nippon Electric-Toshiba Information System and the VLSI Technology Research Union have announced VLSI production techniques of the international level in succession, to attract the attention of the manufacturers of semi-conductors and computers at home and abroad. Fierce competition is going on for the development of the VLSI among the advanced nations of the world, especially between the US, which made an "early start," and Japan, which is struggling to catch up with the US. Some people think that Japan is already ahead of the US in regard to VLSI technology. However, the U.S., too, is rolling back conspicuously. It is said that the 1980's are the decade of VLSI. So the "technological war" between Japan and the US for leadership in the development of the VLSI is likely to become even fiercer hereafter.

The VLSI, which is also called the "super chip," is a device to give a silicon chip, which is several square millimeters, a calculating and memorizing capacity similar to that of the human brain. The integrated circuit (IC), which is the basis for the VLSI, was made, at the beginning, by assembling several tens of transistors on a chip of that size. In the 1970's, the number of such transistors was increased to several thousands by some manufacturers of large-scale integrated circuits (LSI).

Recently, a 64-kilobit (bit is a unit for measuring the volume of information) LSI, which is said to be the "gateway" to the VLSI, has been turned out. The new product has been announced by IBM, a mammoth American enterprise, which succeeded in incorporating such an LSI into a new kind of computer. This LSI contains 100,000 to 150,000 transistors. Following this announcement, the Japanese manufacturers of computers, too, started brisk moves to incorporate a 64-kilobit LSI into computers. Just at such a time, NTT and the Nippon Electric-Toshiba Information System, which is a "laboratory" of the VLSI Technology Research Union, developed a 256-kilobit LSI simultaneously. Furthermore, the VLSI Technology Research Union succeeded in developing the principal mechanical apparatuses and circuit technology necessary for the manufacturing of a one-megabit (one million-bit) VLSI.

The 256-kilobit LSI was made by incorporating about 600,000 circuit elements into a chip several square millimeters. The manufacturers of computers and semiconductors of all countries are now making frantic efforts to develop this kind of LSI. Reportedly, IBM has succeeded in developing it. The concrete details of IBM's new product, however, are not yet know at all. So it is said that the success of NTT and Nippon Electric in developing such an LSI has epoch-making significance. MITI fears, however, that the announcement of this success "may add fuel to the present Japan-US friction over semi-conductors." NTT leaders, too, think that, "it is not wise to irritate the US, at this time when the problem of NTT's opening of its door to foreign bidders is one of the causes of Japan-US friction." As a result, it has been decided to announce the development of a 256-kilobit LSI in academic circles alone, so that this success will not attract great public attention. It can be said that this decision itself indicates how significant it is that a 256-kilobit LSI has been developed.

On the other hand, the Union announced that it has developed, as a result of its research, three new systems -- (1) electron beam pattern delineator, variable line beam raster scan system; (2) electron beam mask inspection system; and (3) electron beam photo cathode projection system -- and the basic structure for a new VLSI memory. They all represent basic techniques and studies essential for the development of one-megabit VLSI. The reason is that one-megabit VLSI is to delineate a submicron circuit, the width of which is even less than one micron (one-thousandth of one millimeter), on a chip several square millimeters. The optical techniques in use at present cannot meet this requirement. So it becomes necessary to develop a machine that can delineate infinitesimal circuits by making use of an electron with a shorterwave-length than that of light. The VLSI Technology Research Union has now succeeded in developing such a machine.

One megabit represents a capacity enough to contain an English-Japanese dictionary on a chip several square millimeters. The VLSI with such a capacity has limitless uses, beginning with use for memory cells of computers. Even IBM has not yet announced techniques for manufacturing one-megabit VLSI.

It is said that, "it is impossible to start the production of 256-kilobit LSI's on a commercial basis at once, because mass production of such LSI's requires review and improvement of more than 100 different processes of semi-conductor production" (Musashino Telecommunications Laboratory of NTT). In other words, the 256-kilo bit LSI is still at an "experimental stage." It is clear, however, that the recent series of successes indicates that Japan's VSLI Technology is on the higher level in the world.

Why are Japan and the US so frantic to develop VLSI? First, the use of VLSI technology for IC production will make it possible to reduce the size of the chip, and the price of the product will go down correspondingly. Also, it will become possible to incorporate more functions into a chip than before, when the size of the chip remains the same. If the 256-kilobit LSI is put on a mass production basis, its price (per bit) will decrease to only one-sixteenth of that of the 16-kilobit LSI, which at present is used for the principal memorizing apparatuses of computers. In the future, it will become possible to reduce the size of the big computer, which is in use at present, to that of a suitcase.

On February 14, Matsushita Electric Industry announced its development of the world's first "two-voice-type, one-chip voice synthesizer LSI," an innovation that can produce male and female voices or a human voice and a sound together with one LSI. Heretofore, usually three LSI's have been necessary for a voice synthesizer. Vice-President Kazuo FUJIMOTO of Matsushita Elecronic Industry proudly announced that "We have succeeded in raising the degree of integration and incorporating the functions of three LSI's into one by making use of VLSI technology." It can be said that the real value of VLSI technology has been proved by the fact that is technology has made it possible to reduce the cost of LSI production, space necessary for the installation of LSI and the consumption of electric power by LSI.

The era of "LSI civilization" has now become a catchword among the manufacturers of semi-conductors. This catchword has its background in the belief that the development in succession of small-sized, low-priced and reliable "conveniences," such as satellite communications, computers, electronic ranges, facsimile, desk computers and digital watches, was made possible by the appearance of a small electronic part called the LSI. Also, it is because of this belief that it is said that "Those who control semi-conductors, which are represented by IC and LSI, will control the world's industries." The Japanese and US manufacturers, therefore, are exerting all efforts to develop the LSI. The US has formulated a plan to have a very high-speed integrated circuit (VHSI) developed by the military complex led by the Pentagon (Defense Department), because of its desire to counter Japan's system for the development of VLSI, which system is characterized by the "unity of the Government and business."

The Japan-US semi-conductor war, which may be called "micro competition," because the competitors must inscribe miniature letters on something like a grain of rice, that is, a chip several square millimeters, is increasing in intensity, with the advent of the 1980's.

History of Renewal of Semi-Conductor Technology

Elements used	Vacuum tube	Transistor	IC	LSI	VLSI	Human Brain
Generations of computers	(1st generation)	(2nd)	(3rd)	(3.5th)	(4th)	
Periods	1906-	1960-	1965-	1970-	1980-	
Complexity (number of parts)	1	1	30 to 50	1,000 to 10,000	several million bits	
Capacity (in terms of memory)	less than one bit	less than one bit	10 bits	4,000 bits	several million bits	ten billion bits

Elements used	Vacuum tube	Transistor	IC	LSI	VLSI	Human Brain
usable impact	radio	transistor for radio	artificial micro satellite computer	FS computer		
number to be contained a cube 10 cm square (in terms of parts)	4 or 5	not more than 150	5 millions	100 millions	several billions to 10 billion	several ten billions

(Excerpt from DEMPA SHIMBUN, February 19, 1980)

The MITI, in its effort to promote the manufacturing technology of semiconductor industry and the aircraft-space industry, which has a great ramification in international competitiveness, recently established the Committee on the Investigation of Manufacturing Technology for Advanced Industries.

The Committee, which is divided into the Working Group for Semiconductor Industry Manufacturing Technology and the Working Group for Aircraft-Space Industry Manufacturing Technology, is to select, and perform researches on, the fields requiring assistance with the participation of the representatives of the relevant industries.

A specific example to which this committee is expected to contribute is the case of the manufacturing equipment of semiconductors. Semiconductor processing technology is dependent on the manufacturing equipment, for which our country is relying on the US-made one. The manufacturing equipment is thus a key to the enhancement of international competitive power.

On the basis of a report submitted by the Committee in March, the MITI is to allocate technological development subsidies.

REVEALING DETAILS ON VLSI PATENTS QUESTIONED

Tokyo COMPUTER DIGEST in Japanese Mar 80 p 84

[Text] According to a story revealed by the VLSI Technical Research Union (Director, Kazuo Iwate), approximately 50 patents held by government related research institutions among the research achievements to date, will be open to the public before the end of January and the patent operation rights will be given to foreign semiconductor makers on a commercial basis.

The technical research union has pursued the development of VLSI, a computer element of the next generation, by investing the total sum of 70 million including the national subsidy since fiscal 1976 as a 4-year plan. This activity for development will be closed by the end of March of this year, which was summarized as "we have achieved satisfactory results as much as we hoped to achieve" (Joint Research Institute Director, Yasuo Tarumi). Some 600 cases for patent application including those developed by the fellow union member private research institutes such as the Computer Research Institute (Fuju Limited, Hitachi, Ltd., Mitsubishi Electric Co., Ltd.) and Nichiden Toshiba Information System (Nippon Electric Company, Limited, Toshiba Corporation) were submitted, and approximately 10 percent of those are the patents belonging to national research institutions.

The arrangement of the union dictates that the patent operation rights of the inventions developed by the private sector are awarded to the respective private organization, standing as a subcontractor, by the VLSI Technical Research Union, and that each maker can offer this right to foreign makers by their own decision. However, proceedings for the patents belonging to the government have not been clarified to date.

On the other hand, exemplified by the Japan-U.S. semiconductor war, it appears that the competition in IC technical development and marketing between Japan and the U.S. will be more intensified in the future. The U.S. semiconductor makers have been strongly pressing our country to make known research achievements by indicating their views that: (1) It hampers fair competition to develop VLSI by the united entity of the government and subsidized industries. (2) It is not fair—but a "technology cartel"—not to disclose the technology developed by the VLSI Technical Research Union to foreign makers.

In response to this, the "go" sign has been already given to the offering of the patents owned by the private sector to foreign makers. However, this time, it has been decided to also open the patents developed by national institutions such as the Electrotechnical Laboratory, and belonging to the country, to domestic and foreign makers. This makes it finally possible, even for foreign industries to use all the achievements developed by the VLSI Technical Research Union by paying a counter value or on a cross license base.

The union translates this as, "Disclosure of patents, in this case, means the opening of the way for foreign makers to be able to use publicized patents, and it does not mean to open all the contents in detail" (Joint Research Institute Director, Tarui), and the MITI also interpretes it as, "This measure will not contribute to the loss of our national interests but, rather it will facilitate beneficial dealings.when importing foreign technologies and negotiating with foreign industries."

Reviewing the achievements of VLSI development to date, technologies essential to the production of VLSI, aiming at a pattern width of below 1 micron, are sprouting, for example, beginning with a reflection optical micro-pattern transcriber which utilizes distant ultraviolet rays and a transcriber which utilizes X-rays, and an electronic beam exposer. With the distant ultraviolent rays (ddp UV) having an especially short wavelength, conventional optical lenses are not at all useful, and therefore a completely new optical system which utilizes only mirrors (reflection) has been developed. This invention has drawn world-wide attention. Even with the electronic beam source, remarkable progress is seen by the development of a way to practicalize the boride lantern. These are the achievements claimed by the end of fiscal 1978, and it is forecast that, in March, an outline of the total results will be announced by the technical research union.

Concerning these developmental activities, a small sector within the industries expressed their opinion in that the offering of the precious property developed even by investing people's tax in foreign groups means a national loss even if it is to be conducted on a commercial basis. However, taking into consideration the prospect that in the future it will be difficult to import technologies as easily as has been done to date in light of the fact that the VLSL technology is a strategic technology extending over to the 21st century, the decision made at this time to disclose all patents is expected to be as useful as "chessmen captured and available for use" in acquiring superb foreign technologies.

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OWING TO VARIOUS AMERICAN CRITICISMS

VLSI research group is going to halt activities at end of March

Japan's VLSI Technology Research Association, which has been under fire from the United States semiconductor industry, is going to cease its research and development activities at the end of March.

Headed by Kazuo Iwata, president of Toshiba Corp., the industry-wide association has been carrying out R&D projects with heavy Ministry of International Trade and Industry aid.

The group has made outstanding achievements in solidifying the technical foundation for manufacturing very large-scale integrated circuits in Japan. But American industry has for some time been criticizing it as another example of the so-called "Japan, Inc."

The decision to totally cease R&D activities by disbanding its research laboratory was made to forestall further complaints from abroad about subsidized R&D activities.

When its activities end at the end of March and the laboratory itself is liquidated in June, the group will remain only as a secretariat to handle administration of patents and refunding of MITI subsidies.

Thereafter, a central role in developing semiconductor technology will be played by the Computer Basic Technology Research Association.

This association was formed in July last year primarily to develop operating systems (basic software) for next-generation information processing systems by the country's leading computer builders.

The VLSI Technology Research Association was organized in March 1976 by Japan's five leading semiconductor-computer manufacturers—Nippon Electric Co., Hitachi, Ltd., Toshiba Corp., Mitsubishi Electric Corp. and Fujitsu Ltd.

It has been carrying out its R&D activities by leasing a part of the NEC Central Research Laboratory premises in Kawasaki. When it stops R&D activities, its secretariat will be removed to a downtown Tokyo building.

A total of 100 engineers from the five manufacturers and the Electrotechnical Laboratory of the Agency of Industrial Science and Technology of the Ministry of International Trade and Industry has been assigned to the association laboratory.

The association's prime objective has been development of VLSIs which will constitute the core of Japanese-made computers in the future designed to counter International Business Machines Corp.'s expected very large-scale computer, known as Future System here.

They have made outstanding contributions toward development of Japan's VLSI industry by carrying out projects in fine engineering, crystal engineering, designing, processing, assessment and device-building fields.

A total of about ¥70 billion has been spent for its R&D activities, of which ¥30 billion has been laid out by the government.

In addition, Nippon Telegraph and Telephone Public Corp. and manufacturers of semiconductor production equipment have cooperated with the association.

This organization itself has drawn attention from foreign semiconductor industries and it has surprised competitors abroad with some 600 patents it has obtained in the short space of four years.

Some of its latest achievements include submicron circuit pattern drawing methods, electron beam devices to draw such circuit patterns, electron beam mask testing devices, electron beam transposing equipment, etc.

Foreign semiconductor producers have been criticizing this group as a type of cartelized arrangement.

On the other hand, some European countries have copied organization and management of the Japanese association and organized similar groups. These countries include France, West Germany and Britain.

Masato Nebashi, managing director of the association, says he is proud of the fact outstanding achievement has been made by the group consisting of employees of six organizations.

In the meanwhile, the computer operating system (OS) group formed last year, which consists of NEC, Hitachi and eight other companies, intends to develop computer software at total costs of some ¥36 billion over five years beginning fiscal 1979.

Some foreign computer builders are already criticizing this group as another cartelized research and development arrangement, while Japanese are hoping this group will attain as outstanding success as the VLSI association.

UPC will establish plant for optical video disc players

Universal Pioneer Corp., formed by Pioneer Electronic Corp. of Japan and International Business Machines Corp. and MCA Inc. of the United States, has decided to install commercial production facilities for optical-system video disc players.

It was revealed by UPC last week that the three-way joint-venture firm has acquired from Sanyo Seiki Manufacturing Co. an 82,500-square-meter tract and a 21,000-square-meter factory structure in Nagano Pref. for the plan.

UPC will install new equipment for video disc players in the factory with a start-up target of the end of this year.

This report is drawing interest from industry quarters as there has been a controversy over which system — optical or stylus — should be adopted for commercial output of video disc players.

However, UPC intends to go ahead with its plan for commercial output of optical-system players. It has already decided to raise its capital to ¥5 billion from ¥2.7 billion at present to install equipment. The proposed capital is larger than the present equity of Pioneer Electronic Corp.

A total of ¥3 billion is earmarked for plant and equipment investment in the current fiscal year of UPC (October 1979-September 1980).

Although the company is refusing to be pinned down about how large the production capacity will be, industry sources believe that the UPC plant will have an output capacity of 30,000 units a month.

They also believe that UPC will eventually produce the video disc itself, as well as the video disc player.

The proposed plant in Nagano will be the second one for UPC, which already maintains a plant in Tokorozawa on the outskirts of Tokyo with a capacity of 10,000 players a month.

With the new plant, the company will have a range of disc players covering professional-use units and players to be sold on the consumer market.

UPC has already shipped 10,000 players to General Motors Corp. of the U.S. largely for employee training purposes.

It has also developed consumer models for sale on the American market beginning the middle of this year. The company also plans to begin marketing industrial-use players on the Japanese domestic market within this year.

ELECTRICALS & ELECTRONICS

TDK & U.S. univ. develop computer language system

In collaboration with the University of Illinois, TDK Electronics Co. has developed a Japanese language interactive computer-based education system.

The Japanese company, a leading manufacturer of magnetic tapes and ferrites, intends to enter into the computer-based education business with the new system.

It plans to develop software in cooperation with leading publishers and educational material manufacturers for marketing the new system.

According to a TDK executive, the business will eventually grow into one having an annual sales comparable with current gross sales of the company — ¥144 billion.

Billed as the PLATO (Programmed Logic for Automatic Teaching Operation) System, the system was originally developed by the Computer-Based Education Research Laboratory (CERL) of the American university.

It is widely acclaimed as the most advanced of all similar systems developed in the world.

The system consists of a central processing unit, composed of a main memory device and an extended core storage, and graphic terminal equipment. Its answer time is 1/8th of a second for several hundreds of terminals.

These terminals are interactive with the central processor, and graphic, character, code and animation displays are facilitated on the display panels of the terminals.

For instance, when a picture of the moon is displayed on the panel and a child touches the picture with his finger, the word of moon is spelled out on the panel and the word is pronounced by a speaker at the same time. In this way, children can learn how to spell the word and pronounce it.

The PLATO System is used at all levels of formal education and in many industries. For example, air carriers are using the system for the training pilots.

For more than a year, the Japanese company has stationed five engineers at the University of Illinois laboratory to develop the Japanese language system.

Stored in the memory system are Japanese characters and phrases as well as basic knowledge of geography, physics, bookkeeping and the game of go.

At present, terminals installed in a room of TDK's main office in Tokyo are connected with the main processing unit at the University of Illinois laboratory by a satellite communication system for reviews of the Japanese language system.

The Japanese company will invite University of Illinois specialists to Japan this spring to merchandise the system.

It is also planned that the company will open computer-based education centers in Tokyo and Osaka to offer education as well as demonstrate the system in operation.

TDK in November formed TDK Core Co. to market education-purpose magnetic tapes. With the computer-based education system, the company is now better prepared to enter the growing market for education and educational materials.

Sanyo Electric sets up venture in Argentina for color TV set prod.

Sanyo Electric Co. has set up a joint-venture company in Argentina to produce color television receivers.

The company announced last week that the joint firm, San Elco S.A., was officially incorporated on February 15. Based in Ushuaia, the firm is capitalized at the equivalent of $2 million.

San Elco will install a color receiver plant on the Tierra del Fuego at the southern end of Argentina. Located on the 54th parallel, it will probably be the southernmost facility with Japanese involvement.

Sanyo Electric, Sanyo Electric Trading Co. and some other members of the group own 50 per cent of the equity, while Radio Miguel and Pei Card Zona Libre share the remaining 50 per cent.

Radio Miguel is the distributor of Sanyo products in Argentina, and Pei Card, based in Panama, is the general agent for Sanyo in Latin America.

The Argentine government offers preferential tariff arrangements to foreign companies operating industrial facilities on Tierra del Fuego island for imports of parts and components.

With a May target for completion, the new firm is now constructing a plant with floor space of 1,000 square meters. The plant will have a monthly output capacity of 2,000 units.

San Elco will produce color receivers with a screen size ranging from 20 inches to 26 inches.

Parts and components will be supplied from Japan, and all receivers assembled by San Elco will be sold in Argentina. The plant will have a work force of 200.

Color telecasting will be initiated in Argentina in May and Sanyo believes that demand for color sets will show a steady increase.

Rice —

(Continued from Page 2)

agreed to buy 250,000 tons of rice on a commercial base in fiscal 1979, and Indonesia and Bangladesh will get 330,000 tons on a deferred payment basis. Contracts, moreover, have been sealed for offering 30,000 tons as a grant under the Kennedy Round of overall tariff reductions.

It appears that in fiscal 1979 ending March, Japan's exports of surplus rice will climb to around 900,000 tons, or about 10 per cent of the world's rice export market.

Such rice export has provoked the ire of the U.S., the world's biggest rice exporter, particularly since the Japanese Government buys up rice from farmers at a price of ¥288,000 per ton and, for need to rid itself of the surplus, is exporting it at an international price of about ¥60,000.

The charge of U.S. farmers is that Japan has begun to usurp traditional American export markets with exports of government-subsidized rice.

Since the Japanese Foreign Affairs Ministry says it has no intent to solve the issue by combining Japan's buying of American grain that have become a "surplus" from its ban on such exports to the USSR with the issue of Japan's surplus rice exports, it appears that Japan is finally going to restrict its exports.

STRONGER THAN PIANO WIRE & HEAT RESISTANT

Nippon Carbon develops epochal type of fiber for industrial usage

An "epochal" new industrial fiber that is said to be stronger than the piano wire and resistant to a temperature of well over 1,000 degrees Centigrade is scheduled to be commercialized in a few years by Nippon Carbon Co. for the governmental Research Development Corporation of Japan, sponsor of the project.

Believed to be the first of its kind ever to be developed, the new silicon carbide fiber was experimentally created about five years ago by Prof. Seishi Yajima at the Research Institute for Iron, Steel, and Other Metals of Tohoku University.

According to the Tokyo corporation, the new fiber has proved to be far better than carbon fiber already widely commercialized. It is stronger than piano wire, can withstand a temperature of 1,300 C with hardly any loss of strength, is compoundable with metals and plastics, and is very light-weight.

Such advantages of the new fiber have suggested possibilities of developing new kinds of industrial material if blended with aluminum, titanium, nickel and ferroalloys.

The achievement thus has drawn inquiries from various foreign research institutions and industrial enterprises.

Silicon carbide itself had been well known as the third hardest kind of substance ever found after diamond and boron carbide.

The governmental corporation said it has decided to have Nippon Carbon undertake a three-year project to develop a practical type of the new fiber with a ¥600 million research and development fund. The company already has a test plant producing 30 kilograms of the fiber a month.

It now will build a pilot plant with a monthly output of 1 ton at its Yokohama factory, and then follow it up with the con-

(Continued on Page 16)

Dry welding under water will undergo testing in Tokyo Bay

Japan's first attempt to do dry welding under water will be conducted in Tokyo Bay off Yokohama late this month.

Dry welding, as opposed to wet welding, is much stronger underwater than the wet type.

U.S. technology is highly advanced. Some American operation corporations are said to have already developed practical methods for doing such job several hundred meters under water. They have reportedly confirmed by tests the possibilities of dry welding even at a depth of 1,500 meters.

Japan's technological lag has been due to little need. The nation has many docks for fixing underwater structures under dry conditions and few underwater pipelines or other structures to take care of.

Underwater welding jobs in Japan have been handled by the wet type. But the wet method performed by divers has had 20 to 50 per cent less welding strength compared with the dry type used on land. The recent revival of Japanese governmental and industrial ocean development efforts has brought a new demand for a better kind of underwater welding method. Use of a special kind of welding rod which expels water from the welding surface of underwater metal structures has been experimentally tried, but is still far from commercialization.

The Japan Marine Science & Technology Center at Yokosuka, a nonprofit institution affiliated with the Science and Technology Agency, has undertaken the task of developing an underwater dry welding method. The center is to use a large depression chamber, just like a cross-channel bridge construction project.

The forthcoming test to last about a week, starting March 22, in waters only about 3.2 to 4 meters deep off the center, is to answer numerous problems involved in such venture including:

—1) Degrees of working and mobility of job.

—2) Occurrences of welding distortion and effectiveness of gas exhaustion and air purification as well as other working safety requirements such as temperature, humidity and pressure inside the chamber, and

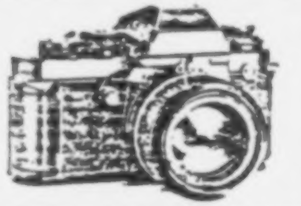
—3) Bending conditions (welding results) and welding strength.

Although still a far cry from the American research the testing project is scheduled to be steadily expanded. Creation of a self-propelled underwater robot is also planned to check structures for wear and tear and damages from a survey ship.

New Products

Chuo Electronics Co. of 1-9-8, Hachimangacho, Hachioji City, Tokyo will shortly introduce a small, low-priced computer which the company says supersedes medium-grade mini-computers. The CBC 8000 Superbase model incorporates a 16-bit microprocessor (Zilog's Z8000 chip) as the central processing unit (CPU). The computer system comprises a 64-kilobyte main memory, two floppy disk drives with 1 megabyte of storage, a 12-inch cathode-ray tube (CRT) display, a keyboard and a printer. The main memory is expandable to 1 megabytes, the company says. The machine is suited for processing business data and making scientific calculation.

The company says Chuo Electronics' entry is expected to further intensify competition in marketing 16-bit microprocessor-incorporated small computers. Price: ¥2.3 million for the mainframe and ¥10 million for the entire system.



Nippon Kogaku K.K. of 3-2-3, Marunouchi, Chiyoda-ku, Tokyo will put on the world market a high-grade single-lens reflex camera, Nikon F3, from March 30. The F3 is to succeed the Nikon F2, which has been largely sharing the market of professional photographers and experienced amateurs in the 1970s. Nippon Kogaku has stopped production of the F2s after turning out some 900,000 units since 1971. The F3 is totally electronized, utilizing a quartz-controlled shutter, etc., and can be operated both as a conventional manual and EE (electronic eye) camera. The EE system determines the suitable shutter speed from the pre-set exposure. The body was designed by the world-famous Italian industrial designer, Giorgetto Giugiaro. The maker expects initial production to be some 7,000 units a month, split equally between the domestic and overseas markets. Price in Japan for the body (also available in black): ¥139,000.

TECHNOLOGY & ENVIRONMENT

Matsushita claims making densely fabricated VLSI

Matsushita Electric Industrial Co. has developed what the company says is the world's most densely fabricated very large-scale integrated circuit (VLSI).

Matsushita's Semiconductor Research Laboratory has unveiled a 64-kilobit static random access memory (RAM) which integrates a total of about 400,000 transistors and resistors on a tiny silicon substrate measuring 5.4 x 5.8 millimeters. Matsushita is the world's first company to succeed in developing a 64K static RAM.

The new memory chip features, among others, a fast access time and a low active power dissipation. These characteristics will pave the way for introduction of a small business computer capable of processing data at a far faster speed than conventional models.

The between-line width of the circuit patterns "drawn" on the tiny substrate measures only 2 microns, far thinner than the 3 microns for LSIs now on the market. The high density became possible by employing an advanced double-level polysilicon technology, a Matsushita spokesman says.

The memory unit contains many complementary metal-oxide semiconductors (CMOS) which consume less power than ordinary MOS. Because of this, its active power dissipation stands at 300 milliwatts, half that of 16K static RAM chips developed by Matsushita in 1978. This means that while the storage capacity was quadrupled, the power dissipation was halved.

Furthermore, the typical access time was shortened to 80 nanoseconds, compared to 100 nanoseconds for 16K static RAM chips.

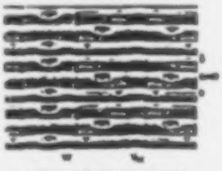
These two achievements have broken the conventional "wall" that lowering of power consumption and speeding up of data processing are incompatible.

All pins are TTL (transistor-transistor logic) compatible and the RAM chip operates from a single 5-volt supply.

Technologically speaking, development of the 64K static RAM chip is as difficult as that of 256K "dynamic" RAM chips which already have been unveiled by some research laboratories.

Matsushita disclosed the 64K static RAM at the International Solid-State Semiconductor Circuit Conference held in San Francisco in the middle of February.

At present, Matsushita has no specific plan to commercialize the new memory chip.



64K static RAM chip enlarged by electron microscope

Gov't council urges realization of dependable method for COM prod.

The Resources Council of the Science and Technology Agency, recently called for a dependable method of producing and applying Japan's still-experimental mixed coal-oil fuel.

This was part of a survey report submitted to State Minister Yuji Osada, director-general of the agency, by the council in connection with the coal-oil mixture (COM), a new versatile industrial fuel created by Electric Power Development Co., of Tokyo, a semigovernmental institution, and some Japanese industrial circles.

The company's COM research and development project has continued since 1974. It will be field tested with different electric power plants in fiscal 1980 because the Government has decided to finance the testing under the fiscal 1980 national budget. Beijing (Peking), also interested in COM, has requested technological instructions for producing China's version of COM.

In its report, the council emphasized its belief that COM will make an excellent stop-gap fuel to save oil and use low-grade coal, pending full development of a good coal liquefaction or coal gasification process.

COM is produced by blending fuel oil C with 10 to 50 per cent powders of coal, which may be even the poorest grades so far industrially ignored, such as sub-bituminous and brown coal.

The council has recognized that on top of such merits, COM may be handled and heated just like fuel oil and is fit for mass transportation by ship.

More significantly, the council confirmed that COM is applicable to existing crude or fuel oil-burning boilers or furnaces with minimal alterations — even in steelworks as a supplementary blow-in blast furnace fuel. The council thus visualized at least 17.8 million tons of annual national demands for COM if it is developed into an unobstructory usable form. As for commercial cost accounting, it expects COM to be more economical than fuel oil C if the latter's price goes up to between ¥30,000 and ¥35,000 a ton, assuming the per-ton price of coal to be ¥7,200, the average domestic bituminous coal price a few years ago.

AS SEQUEL TO U.S. COLOR TV RESTRICTION

Matsushita is going to pull out from Korea National Electric

Matsushita Electric Industrial Co. has decided to withdraw its share of the equity of Korea National Electric Co. The withdrawal will be made as Matsushita's 50-per-cent shareownership of the Korean firm will be sold to the Korean partners of the joint-venture company.

Korea National Electric has been mainly producing color television sets for export to the U.S. but it has been cutting back its output as American import restrictions have been strengthened.

It is, however, agreed between Matsushita and its Korean partners that the Japanese firm will continue to provide the Korean associate with technical assistance for production of color receivers and some other consumer electronics items.

Korea National Electric was formed in 1973 as part of Matsushita's overseas strategy but the Japanese firm is now forced to withdraw its share of the 400-million won capital. With Hyang Soo Kim installed as president, the company is based in Incheon for production of color sets, black-and-white television receivers, stereo amplifiers and radios.

At its peak, the plant turned out 10,000 units of the 14-inch color set. The plant was put into operation in October 1973.

However, government-to-government agreements concluded by Japan and Korea with the U.S. to control exports of color sets have forced exports to American markets to decline sharply.

Korea National Electric attempted to diversify its markets into Latin America and some other areas and widen the variety of its products, but these attempts have failed to offset declines in sales and profits.

Worse still, there is no market for color sets in Korea because color telecasting has not been initiated yet.

In addition, there is a regulation in Korea which restricts shipments to Korean domestic markets below levels of exports. There is also a regulation whereby shipments to Korean domestic markets are limited to 30 per cent of production when foreign companies own 50 per cent of the capital of a joint-venture firm.

Inflation, which has raised wage and cost levels, has also forced the joint-venture firm into the corner. The firm, which maintained a work force of 700 at its peak, now employs only 400 workers.

Despite the present decision, Matsushita will continue to station its engineers at Korea National Electric and cooperate with the direct investments.

Hitachi Maxell will expand magnetic tape prod. capacity

In competition with TDK Electronics Co., Hitachi Maxell Ltd. has decided upon a major expansion plan for production of magnetic tapes. Under this plan, four subsidiary plants as well as its main plant in Kyoto will be expanded at total costs of at least ¥1.5 billion.

With the entry of Matsushita Electric Industrial Co. into the magnetic tape field, it is now expected that competition among Japanese tape producers will be further intensified.

Under the new plan of Hitachi Maxell, video tape production facilities will be installed on its Kyoto plant premises, and audio cassette plants of four subsidiaries will be expanded to handle the increased output at Kyoto.

The four plants to be expanded are situated at Osaka, Fukui and Kurobe, Toyama Pref. (There are two plants in the Osaka area.)

A new video tape plant is expected to be put into operation in August. The company will have a total video tape output capacity of 500,000 reels a month then — which is double the present capacity.

The firm is also expected to have a total production capacity of 1 million reels a month by the end of this year as additional facilities are readied. At the same time, the company plans to expand its audio tape output capacity to 15 million reels a month from 12 million reels at present.

With professional-use tapes, such as open-reel tapes sold to Japan Broadcasting Corp., and products to be sold under the brand names of purchasers, the company will be producing some 20 million reels of audio tapes a month. In addition, the company will triple its capacity for metal tapes by next spring to 300,000 reels a month.

Meanwhile, TDK is now producing 1.7 million reels of video tapes a month, which will be raised to 2 million reels by the end of this year. Major expansion for metal tapes and ordinary video tapes is also planned by the firm.

Toshiba will not raise semiconductor prices due to gold

While other semiconductor producers are raising prices because of price hikes in gold and silver, Toshiba Corp. has revealed a policy of not raising prices of its semiconductors.

Led by American producers represented on the Japanese market, Nippon Electric Co., Mitsubishi Electric Corp. and Tokyo Sanyo Electric Co. have adopted the so-called gold adder system and they raised prices as from April 1. (JEJ-March 18 issue)

Hitachi, Ltd., which has not yet effected price hikes, is also considering raising prices on the grounds that high prices of gold have forced the company to spend ¥10 billion more for the past year than originally estimated.

Toshiba has become the first company to announce no price hikes.

According to a senior executive of Toshiba's semiconductor

Oki also will boost expenditure

Oki Electric Industry Co. has decided to double its plant and equipment investments in the semiconductor field in fiscal 1980 over that of fiscal 1979.

According to Masao Miyake, president of the firm, investments will total ¥10 billion and a major part of it will be laid out for installation of facilities for very large-scale integrated circuits (VLSIs) in Miyazaki Prefecture on the southern main island of Kyushu.

This plan is based on a policy adopted two years ago when Miyake was appointed president of the firm to emphasize the semiconductor field.

Miyake has repeatedly

are in the semiconductor field."

In fiscal 1979, the company had originally planned to invest ¥4.1 billion in the semiconductor field, but actual investment will total ¥5.3 billion.

With these investments, the company intends to raise its semiconductor sales to ¥27 billion in fiscal 1980.

Although this sales target figure is far below a level of ¥100 billion of Nippon Electric Co., Hitachi, Ltd. and Toshiba Corp., it represents a rise of 50 per cent over fiscal 1979.

When the Miyazaki plant is started up next year, the gap

ELECTRICALS & ELECTRONICS

Corning will fully advance into electronic parts mkt

The world's largest special glass producer, Corning Glass Works of the United States, is going to enter the Japanese market with its electronic parts.

In the initial phase, Corning K.K., a wholly-owned subsidiary of the American company, will market U.S.-made products in Japan but it will begin producing various products in Japan within two years.

Corning glass and ceramic products for electronic applications are mostly authorized by the U.S. military standards (MIL) and they are known for their high level of reliability.

The current plan reflects a belief in the American company that the Japanese market will continue to grow rapidly for many years to come.

Marketing plans in Japan included metal film fixed resistors, ceramic capacitors, glass capacitors, and other items.

Corning's metal thin film resistors control some 40 per cent of the American market and 20 per cent of the European market.

Its glass capacitor is practically the only one of its kind in that glass forming technology is applied for output of resistors.

These resistors are suitable for use in ocean development and defense equipment on which servicing may not be carried out easily.

The capacitors of ceramics largely take the place of those of silver and other precious metals for the low cost and high performance features.

Full-scale marketing of Corning products will soon be initiated by Corning K.K., which has just installed testing equipment at its head office in Tokyo's Akasaka area.

Emphasis will be placed upon the market for communications equipment, measuring instruments, computers, metal equipment and space development equipment.

In the next phase, the U.S. firm will enter into production of metal film fixed resistors and ceramic capacitors.

The company is now studying whether the wholly-owned subsidiary alone should enter production in Japan or a joint-venture company should be formed. The acquisition of an existing Japanese company is also considered.

It is generally believed that the Japanese market for ceramic and glass parts for electronic applications is as large as ¥50 billion, and Corning K.K. has a target of raising its sales to ¥2 billion in five years.

The American company is now producing some 60,000 kinds of glass and ceramic

(Continued on Page 19)

Nippon Electric plans to invest ¥30 billion in semiconductor field

Nippon Electric Co. is going to make a record ¥30 billion investment in the semiconductor fields alone in fiscal 1980, begun April 1.

The figure is ¥3 billion larger than the ¥27 billion for expansion of NEC's semiconductor facilities in fiscal 1979—the largest on record then for any Japanese semiconductor producers.

This new investment plan is based on belief that world markets for integrated circuits, large-scale integrated circuits and other semiconductors will continue to grow for some more years.

With the new plan, which accounts for about 84 per cent of NEC's total plant and equipment investment in fiscal 1980, the company will have a monthly LSI production capacity of 20 million units by the end of fiscal 1980.

Some ¥6 billion is earmarked for installation of the sixth diffusion line at the firm's facilities in Kumamoto, Kyushu.

Also, about ¥4 billion will be laid out for installation of another diffusion line at its Sagamihara plant on the outskirts of Tokyo.

It is expected that the facilities in Kumamoto and Sagamihara will be producing 64-kilobit and 256-kilobit random access memory chips and other advanced types of semiconductors.

A decision has also been taken to invest about ¥2 billion for installation of additional equipment at Electronic Arrays, Inc. of Mountainview, Calif. NEC acquired EA's entire equity in December 1978.

With the new investment plan, the company hopes that its semiconductor production will total ¥284 billion, and sales will amount to ¥294.5 billion in fiscal 1980.

The production target is 25 per cent higher than the estimated figure for fiscal 1979, while the sales goal is 30 per cent higher.

The company also has set a target of exporting ¥60 billion worth of semiconductors in fiscal 1980, 50 per cent over the

Nippon Univac will 'diagnose' big computers

Nippon Univac Kaisha, Ltd. has initiated a new service "diagnosing" large-scale computers at its clients' offices t assure better maintenance.

The new service employ self-diagnosing devices base on data from practically a mechanical failures that hav taken place in the world.

Although all computer manu facturers are trying to improv service, Nippon Univac intend to carry out continuous dia gnoses of all its computers in stalled in Japan.

Billed as the TRACE System the new service will be render ed to all the UNIVAC-1100/6 Vanguards installed in th country.

The machine model will b connected with a compute built for this special purpo which is installed in Tok

The computer in Tok regularly records operation the machines hooked up to and analyzes the recorded da so that service needs may b monitored.

As another feature of the ne service, it may cut down ma power requirements for tec nical services. It is said th many technicians are require for machine maintenance. In duced. Currently, many kinds of such cable are available for practical use. They incorporate compounds such as 1V·3Ga, [illegible] and 1Nb·2Al and alloys such as Nb-Ti, Nb-Pb and Nb-Ta. Of these, the Nb-Ti alloy is the most popular and is under commercial production.

As far as the critical temperature (at which superconductivity [illegible]) and the critical magnetic field are concerned, the alloys are less efficient than the compounds. The superconductivity is lost when the magnetic field force exceeds that of the critical magnetic field and is recovered when it is lowered. However, [illegible] cables are directly produced from ingots by the mire-[illegible] method, a mass-production system has already been established.

Superconductive cable consists of 2,000 to 3,000 extra-fine [illegible]ents wires in a bundle. Each element wire consists of a copper tube of about 50μm diameter plugged with superconductive metal.

When superconductivity is lost for any reason, the electric resistance of the superconductive metal generates a large quantity of heat. Copper can conduct the electric current when superconductivity is lost and increases the cooling effect. Thus, wires coated with copper are stable and of high efficiency.

An important problem arising with superconducting magnets is the question of the generation of a strong magnetic field. In Japan, a world-acclaimed superconducting magnet which is made of the Nb-Ti alloy and can generate 8.5 tesla (tesla is a unit of magnetic field) has been developed by the Furukawa Electric Company Ltd. Using the magnet, the Japan Atomic Energy Research Institute has been developing an experimental model of a nuclear fusion generator whose practical use is expected in the 1990's.

The niobium-titanium alloy currently most popular as superconductive cable material is considered to have properties close to the limit of obtaining a strong magnetic field. Although adding tantalum to the alloy can increase magnetic field strength, very low temperatures are required, such as 3.5K and 1.8K, which are lower than that of liquid helium. Thus, it is necessary to develop ultra low temperature technology to obtain such very cold temperatures.

Intermetallic compounds are preferred to alloys to obtain stronger magnetic fields like 12 to 15 tesla. In Japan, the National Research Institute for Metals and cable makers have been conducting research into intermetallic compounds. It will be some time yet before the practical use of them can be started. Within these researches, investigations on 1Nb·3Sn and 1V·3Ge are in progress. Fragility of superconductive cable made of intermetallic compounds requires special means of making wire. For example, a coil is made of niobium and tin using niobium tube plugged with niobium powder or tin—coated niobium cable. The coil is then heated to produce 1Nb·3Sn by reaction. However, this method needs heating of the coil to about 1,000°C for several hours in the presence of inert gas. These requirements only allow production of small magnets.

Included in other investigations are a coil that is formed by winding tape on which a thin film of 1Nb·3Sn is precipitated, and the process whereby many niobium filaments are embedded in copper· tin alloy to form filament-type niobium 3 tin by solid state diffusion thermal treatment.

More compact superconducting magnets with higher magnetic fields are required for practical use in nuclear fusion reactors and electric energy storage.

Density and Capacity Increase for Magnetic Bubble Memory—256K Bit Chip Developed—

The Musashino Electro-Communication Laboratory of Nippon Telegraph & Telephone Public Corporation has developed a 5.7mm x 6.0mm chip having a capacity of 256k bits.

Magnetic bubbles are magnetic zones that exist stably when a single-crystal film (wafer) made of a special magnetic material is placed in a suitable vertical magnetic field. They act as cylindrical magnets. Seen under a microscope, they look like tiny "bubbles". These bubbles can be moved (transferred) freely in a wafer, and also can be generated or deleted at any point. The magnetic bubble memory is designed for memorization, including writing, storing and retrieving, by making use of these properties of magnetic bubbles. The presence and absence of bubbles is made to correspond to binary "1" and "0" respectively.

This memory method is non-volatile, has a high memory density, is compact, light-weight, and free from mechanically moving parts. Thus, it is expected to find wide application in large-capacity solid-state files which are likely to replace magnetic drums and disks.

Further to achieve wider application of the magnetic bubble memory, memories must be manufactured at lower cost. For this purpose, it will be effective to increase the memory density and capacity of magnetic-bubble memory chips as the minimum unit of memories. This is because larger capacity chips will enable the number of chips required for memories to be reduced, and also enable electronic circuits (peripheral circuits) for chip memories to be reduced.

For this reason, the increase of capacity of chips has been promoted the world over at a striking speed of 2.5 times per year from the initial 4k bits. Electronic exchangers use 64k bit chips.

The chip system for basic bubble memories is the same as for the major-minor loop system for 64k bit chips. The chip is divided into two sections. One is for minor loops for storing data in the form of bubbles and the other for major loops which temporarily arrange bubbles during storing of bubbles in minor loops or retrieving bubbles out of minor loops. At the junction of these two sections are gates for bubbles for individual loops. To write data in, the data is converted into bubble rows by the bubble generators located in major loops and stored in minor loops through the gates. To retrieve memorized data, bubbles are transferred from the minor loops to the major loops through the gates and then read out as electric signals by the detectors located in the major loops.

The newly developed 256k bit chip contains 274 minor loops. Each loop is able to form 1,070 magnetic film patterns (transfer patterns).

Applying a rotary magnetic field to the magnetic film patterns causes bubbles to move in the patterns. Memorization in gates for controlling transfer of bubbles between major and minor loops and for the generation and division of bubbles is performed by applying a rotary magnetic field with electrically energized metallic conductor patterns (on which magnetic film patterns are placed. Thus, it is very important in designing chips to minimize the rotary magnetism and currents passing through conductors.

One of the methods of obtaining 256k bit chips is to use an area 4 times the current 64k bit chip to provide a memory capacity of 256k bits. But this method has the drawbacks of requiring larger volume of coils to generate the rotary magnetic field and higher power consumption resulting from the larger area.

Aiming to develop a 256k bit chip rather smaller in area than the 64k bit chip (6mm x 7mm), the Laboratory studied shapes and structures of patterns which will permit delicate machining and reduced rotary magnetism.

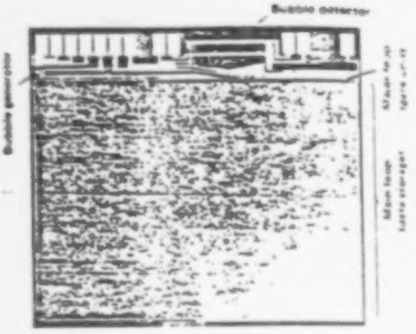
T-bar transfer patterns used in the current 64k bit ships of the Laboratory have a pattern interval equal to a quarter (1.25μm) of the bubble diameter (5μm). At the very beginning, the Laboratory manufactured a chip simply half in size of the T-bar transfer pattern unit to provide 4-times the memory capacity and examined the resultant problems. The results revealed that although technology for delicate machining could be established, the rotary magnetism for chip driving had to be increased too high to be practical.

Thus, an asymmetric chevron pattern unit (see Fig.1) was used to transfer patterns. This pattern unit has twice the pattern width and pattern interval of the T-bar pattern unit and has the advantages of easy manufacture and needing lower rotary magnetism. This transfer pattern unit has opened the way to the production of 6mm square 256k bit chips.

Since chips have various memory functions, their properties depend on the worst of their component functions. The gate detectors used in 64k bit chips were difficult to manufacture and required increased rotary magnetism and control currents with decreasing bubble diameters.

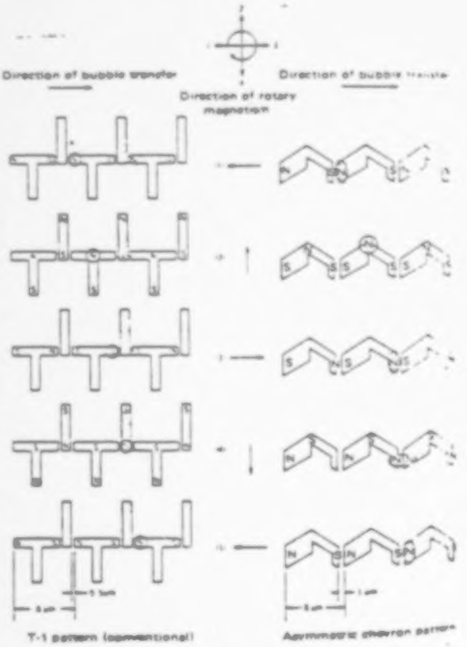
For the new 256k bit chip, a gate requiring low rotary magnetism and control current and providing high operational stability has been developed by optimizing the design of the shapes of magnetic film patterns and conductor patterns and their relative positions. Also, study was pursued on the shapes of detectors and the materials and methods of manufacturing magnetic films because smaller bubble diameters result in lower detection sensitivity. And thus, a highly sensitive detector which is able to work stably with low level rotary magnetism has been developed.

Bubble generators and gates of conventional chips have structures in which a conductor pattern unit and magnetic film transfer pattern unit are interleaved with insulator laminates on a wafer. Where these two pattern units are overlapped, the upper transfer pattern unit is undulated (uneven in surface).



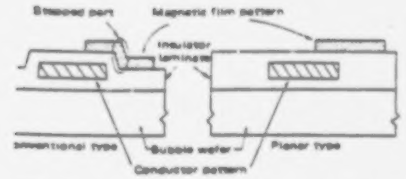
The chip measures 5.7mm x 6.0mm

Photo 1. 256-k Bit Magnetic Bubble Chip


Direction of bubble transfer
Direction of rotary magnetism
Direction of bubble transfer
N
S
5 μm
8 μm
1 μm
8 μm
T-1 pattern (conventional)
Asymmetric chevron pattern

Bubbles move as they (S poles) are attracted towards magnetic poles (N) in patterns which change according to the direction of rotary magnetism. The pattern interval of the asymmetric chevron pattern units used in 256k bit chips is twice that of the T-1 pattern units.

Fig. 1. Illustration of Bubble Transfer in Patterns


Stepped part
Magnetic film pattern
Insulator laminate
...nventional type
Bubble wafer
Planar type
Conductor pattern

...parts seen in conventional chips are not seen in the newly ...d planar structure.

Fig. 2. Cross Sections of Chips

...ng rotary magnetism causes magnetic poles to occur at ...ted points, preventing normal operation of bubbles. ...igher rotary magnetism is required for bubble transmission. The increase in this magnetism was found to be negligibly small for 5μm-diameter bubbles (in 64k bit chips) but as large as double thus for 2μm-diameter bubbles (in 256k bit chips).

In order to prevent an increase in required rotary magnetism, it is necessary to eliminate uneveness in the transfer pattern unit. For the 256k bit chip, a method was developed to eliminate this uneveness by burying the conductor pattern in an insulator laminate. Structures without undulation are called planar structures.

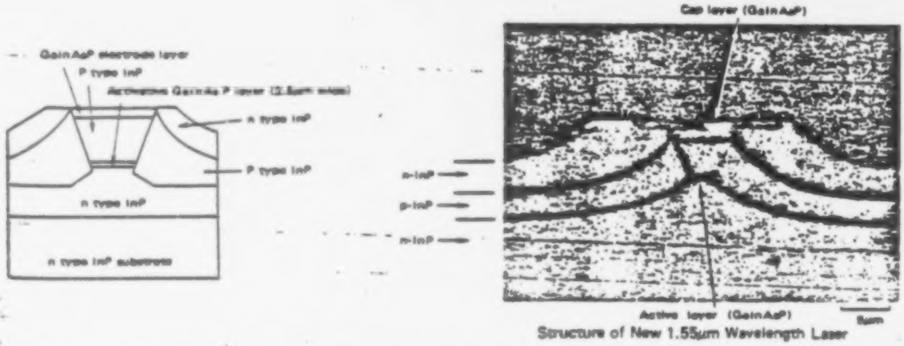
The 256k bit chip developed in this way conforms in properties with the design objectives. Compared with any other being developed in Japan or elsewhere, it is 1/3 in chip area, has the shortest access time (time required for retrieval) and minimum rotary magnetism. Also compared with the 64k bit chip used in electronic exchanges, it has nearly equal access time and power consumption, and has a 4-times the memory capacity despite being smaller in chip size.

μm-band Semiconductor Laser

...e Musashino Electro-Communication Laboratory of NTT ...xperimentally made a high-performance semiconductor ... with an activated layer embedded structure which is ...le of continuous oscillation up to 65°C with a maximum ...t of over 15W, a wavelength of 1.55μm and a minimum ...red current (oscillation threshold) of 25A (at 26°C).

...e Laboratory has been studying semiconductor lasers ... InP/GaInAsP system crystals. In the 1.5μm band, planer ... have been manufactured. Lasers of this structure, however, ... the drawback of high oscillation thresholds. To eliminate this, a structure having the GaInAsP activative layer buried has been tried, but this structure is hard to make by conventional liquid phase growth. Thus, a new low-temperature liquid phase growth method has been developed, eliminating these difficulties, to produce a 1.5μm band high-performance semiconductor laser.

Continuous operation of a planar laser was successful last year at room temperature in the 1.55μm wavelength. It had an oscillation threshold of 140mA–200mA. The new structure used in the trial manufacture had an activated GaInAsP


GaInAsP electrode layer
P type InP
Activative GaInAsP layer (2.5μm wide)
n type InP
P type InP
n type InP
n type InP substrate
Cap layer (GaInAsP)
n-InP
p-InP
n-InP
Active layer (GaInAsP)
5μm

Structure of New 1.55μm Wavelength Laser

Fig. 1. Buried Structure Semiconductor Laser (for 1.55μm)

IN DRIVE TO ACHIEVE SUPERIORITY IN VLSI FIELD IN FY 1980

Semiconductor firms are slated to make capital expenditures of about ¥140 billion

[illegible]
[illegible]

To prepare for the coming era of very large-scale integrated circuits (VLSIs), Japan's semiconductor makers are planning to make plant and equipment investments totaling some ¥140 billion in fiscal 1980, or 30 per cent more than the record investments made last year, in order to mass produce VLSIs expected to be put to practical use on a full-scale basis in the 1980s.

They already have started building production lines for 64-kilobit random access memory (RAM) chips, the so-called "gateway" of VLSIs.

The investment competition is sharply intensifying as such medium and lower-ranked semiconductor makers as Fujitsu Ltd., Mitsubishi Electric Corp and Oki Electric Industry Co. are actively resorting to rollback tactics to narrow the gap with the Big 3 makers—Nippon Electric Co., Hitachi, Ltd. and Toshiba Corp.

[illegible]

Mitsubishi Electric Corp used its Kita Itami plant in Itami City, Hyogo Prefecture as the site for the ceremony held on April 1 to welcome employees hired by the firm this year.

The Kita Itami plant represents the stronghold for research and development of Mitsubishi's semiconductor division.

Sadakazu Shindo, president of Mitsubishi Electric, had been stressing the need to lay stress on electronics as Mitsubishi's management strategy in the 1980s.

He decided to have the ceremony held at the Kita Itami plant in order to drive home to the new employees the importance of the semiconductor division represented by integrated circuits (ICs) and large-scale integrations (LSIs).

There is a reason for Shindo to resort to such a step. Mitsubishi Electric is known as the first Japanese maker to start producing ICs in Japan. But sales of its semiconductor division at present are only a third that of Nippon Electric Co., the top maker. Therefore, Shindo is showing interest in staging a rollback, saying that the situation at present is embarrassing for his firm.

Consensus

It is the consensus among Japan's 10 major semiconductor makers that the fate of the electronics makers will depend in the future on the strength of their semiconductor division. As can be seen in the attached table, the 10 major makers who also are representative makers in the computer, telecommunications machinery, general electric machinery and household electric appliance industries, drastically increased their investments in the semiconductor sector.

This is because they feared that the management strategy of their firms will be affected if they neglect making investments in the semiconductor sector which represents the nucleus of electronization. Such investment competition is becoming further intensified with the target placed on the commencement of a VLSI era.

Of the semiconductor makers, Nippon Electric has revealed plans to make a record ¥30 billion investment in fiscal 1980. A company official hinted that the investment plan may be revised upward during the fiscal year, saying that the IC business will continue to be favorable in the future and that an increase in sales depends solely on supplying capacity.

Integration

The two other top makers of Hitachi and Toshiba also plan to maintain the high level investments in the semiconductor sector.

One of the reasons for the unlimited ceiling in investment amount is that the makers have started to engage earnestly in the construction of mass production lines for VLSIs. The makers are setting their target on mass production of 64-kilobit LSIs in which more than 100,000 transistors are integrated on tiny silicon chips.

Such 64-kilobit LSIs are expected to be used for computers on a full-scale in the first half of the 1980s.

In the semiconductor industry affected by technological innovation, a maker who succeeds in mass production ahead of rival makers wins out eventually. The interest shown by the maker then is extraordinary, and this has appeared in the form of an increase in investments.

Nippon Electric plans to strengthen and improve facilities already established at its plant in Sagamihara City, Kanagawa Prefecture for test production and development of VLSIs. It also plans to rush completion of the sixth diffusion line at its plant in Kumamoto City, for turning out 64-kilobit LSIs and also to prepare for the advent of the 256-kilobit LSI era.

Work on the diffusion line at the plant, said to be one of the world's largest LSI mass-production plants, was started last year, or six months ahead of schedule.

Second group

Of the other top makers, Hitachi has set aside its Musashi plant in Kodaira City, Tokyo and Toshiba its Oita plant in Kyushu as production bases for VLSIs. They are now engaged in installing lines for turning out 64-kilobit and more integrated LSIs.

Mitsubishi Electric also plans to use half of the amount set aside for investments in fiscal 1980 in building new facilities at its second Kumamoto plant in order to win over other makers in the competition and to join the top-level group of makers.

Other manufacturers who are trying to overtake the top makers are exerting efforts in strengthening and improving their main plants.

For instance, Matsushita Electronics Corp is actively engaged in building the semiconductor division of its Nagaoka plant in Kyoto, Sharp Corp its Tenri Plant in Nara Prefecture, and Tokyo Sanyo Electric Co. its plant in Oizumi in Gumma Prefecture.

In addition, Fujitsu is to start work in fiscal 1980 for building a plant boasting the latest facilities in Kanagasaki, Iwate Prefecture, and Oki Electric Industry in Miyazaki Prefecture in Kyushu.

It is expected "average" for major makers in the semiconductor industry about to enter into the VLSI era, to set aside investments in the ¥10 billion level annually for some years to come.

U.S. industry

As for semiconductor makers in the U.S., who are suffering from record high interest rates, Fairchild Camera & Instrument Corp has placed itself under the wings of Schlumberger, a U.S.-French firm producing oil exploration equipment, in order to secure channels for funds to engage in test production and development of VLSIs, while Mostek Corp is affiliated with United Technology, a conglomerate connected with the aerospace industry.

Against this, major makers in Japan are in a position of being able to procure on their own huge amount of funds for research and investments over a long period.

There is possibility that such "strength" enjoyed by the Japanese makers will result in raising the tone of attack against Japan by the American industry who are showing serious concern over the advance made by Japan.

CAPITAL SPENDING FOR SEMICONDUCTOR PLANTS AND FACILITIES

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Note: [illegible]

Vanishing Miracle? —

(Continued from Page 24)

ease the predicament of workers through maintaining manpower levels despite underutilized capacity.

In another reflection of this strong relationship, Japan's industry over the years has evidenced little disruption in production as a result of labor disputes.

Should Japan begin experiencing disruptive strikes and wage settlements which by themselves diminish an industry's international competitiveness, we would have a tangible indication of deterioration in management-labor relations and diminished worker loyalty.

Bank-corporate borrower relationship

Despite the record levels of bankruptcy experienced since 1974, Japanese banks have typically continued financing even deficit-ridden borrowers with which strong managerial and financial ties have been established.

The support has extended beyond the top tier of industrial and commercial enterprises (witness the crisis merger of Ataka into C. Itoh through the support of several Japanese banks).

Should Japanese banks evidence a pattern of terminating financial support for long standing customers with which they provide management, extend substantial credit lines, and rank as major shareholders, a critical link in Japan's highly leveraged economy would be weakened.

The pattern of support which has been evidenced to date indicates a willingness of banks to continue financial assist firms in financial crisis beyond the point where their self interest, strictly defined, would dictate demand for repayment of outstanding loans.

Government-business relationship

Governmental ministries facilitate the development of Japan's economy in a number of ways including allocation of financial resources, expansion of production capacities among market participants, providing tax incentives, and offering research and development subsidies.

When industries have reached maturity, the government has facilitated formation of recession cartels and industry-wide capacity reductions.

Should the responsible governmental ministries allow the marketplace to unduly buffet individual important Japanese businesses without its moderative influence or fail to identify and nurture new growth industries, a critical element would be lost in an economic system built on consensus decision making.

The breakdown could be evidenced by predatory practices of industry leaders, by the bankruptcy of firms of national importance, or by loss of international competitiveness by specific industries as a result of non-recurring events such as one-time major currency revaluations.

Conclusion

World political and economic conditions in 1980 once again cast a shadow over the economic future of many nations, including Japan.

With its dependence on international trade, its highly financially leveraged business sector, and with business practices in general differing markedly from Western conventions, Japan's economic resilience continues to be doubted by some observers.

Japan's social structure is one important factor driving the nation's economic machine. Japan will more than likely continue as a dynamic industrial power due to the continued effectiveness of government, management and labor in adapting to change.

Any prospect for sustained economic adversity would likely reinforce traditional values and relationships.

Three decades of sustained rapid economic growth certainly have not measurably eroded the relative economic efficiency of Japan's social system.

Clearly, it is premature to conclude that Japan has lost its "economic miracle" or that its economic vitality has been materially diminished through substantial erosion of its work ethic.

Any actual erosion of worker loyalty and efficiency should be reflected in group inter-relationships well in advance of an economic decline.

Foreign exch. —

(Continued from Page 3)

these, there were deals involving Canadian dollars, Singapore dollars and South Arabian riyal.

The biggest reason for the sharp increase in such transactions was the diversification of Japan's external capital dealings. In other words, in the midst of the sharp fluctuations of the foreign exchange market, and widening of the interest rate differential among countries, Japanese enterprises sought to procure money at the lowest possible cost, such as inducting impact loans denominated in Swiss franc or actively pushing DM-denominated foreign bond flotations. The result was the bringing into the Tokyo foreign exchange market of foreign currencies other than the dollar.

SI Technology in Japan

The complexity of large scale integrated circuits (LSIs), increasing by a factor of two every year. The increase in nplexity and the break down into various components given in Fig.1. Many new variations of circuit design and cess technology have arisen that lead towards denser and her performance integrated circuit structures.

Major efforts in the development of advanced LSIs are being made in Japan. At the 1978 ISSCC (international idstate Circuit Conference), some novel LSI's were reported n Japan.

The linear dimensions of the LSI chip pattern must be reased, because the increase of LSI complexity rather ends on microfabrication. This causes limits on optical ography, so new fabrication technologies, including electron m pattern drawing, are being sought.

This paper will review the recent achievements in LSI hnology in Japan, citing reports presented at the 1978 CC.

High-speed and High Density Logic

Logic LSI devices are increasing in speed and density year year. Speed performance and power per gate are the para- ters of importance for logic LSIs. Fig.2 gives propagation y (speed performance) against power dissipation with delay-power product lines included. This shows that the nology can roughly be separated into two groups – the denser, lower performance MOS (metal oxide semiconductor) processes and the high-performance, low-density bipolar approaches. For low-power considerations, CMOS (complementary MOS) and IIL (integrated injection logic) are the available choices.

Japanese computer mainframe manufactures are producing and using their own ICs for their large computer systems. Many of these ICs are of advanced design as far as performance is concerned.

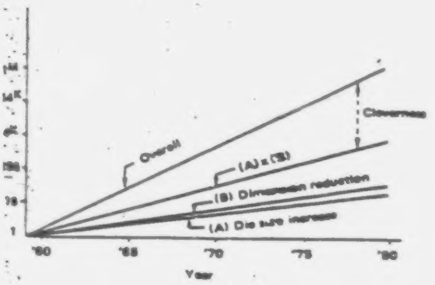
For example, the 200-gate LSI chips for reduced-power versions of conventional ECL (emitter coupled logic), feature gate delay of 0.7 nsec and power delay product of 7pJ. These chips are handled by automated tape bonding (TAB) systems.

Several new bipolar technologies, although presently in the laboratory development stage, have yielded some excellent results and showed potential for IC logic technology.

Static induction transistor (SIT) logic IC gates with power-delay products of 0.006pJ have been reported in 1977. This logic is an advanced version of the SIT and uses integrated SITs in place of conventional inverse transistors in IIL circuits.

An EEIC (elevated electrode IC) logic gate was also developed in Japan. It achieved a power-delay product of 0.1pJ at propagation delay of 85ps – the best result ever attained by bipolar technology. The EEIC structure utilizes an overhanging poly-silicon layer that makes possible extremely tiny transistors without the need for precision mask alignment during fabrication.

This year's ISSCC showed that LSI chips are ready for



1. The Increase of Complexity of IC and the Break Down into Various Components

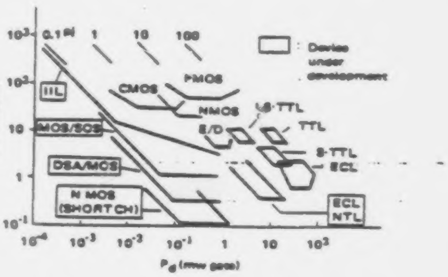


Fig. 2. Propagation Delay Versus Power Dissipation for Typical Logic Circuits

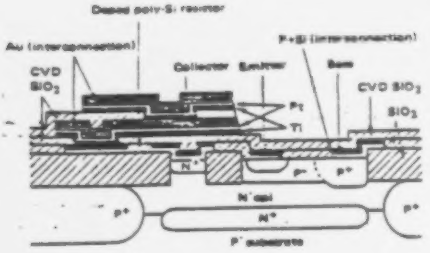


Fig. 3. Cross Sectional View of the LSI Device

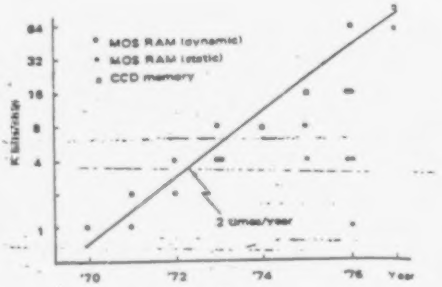


Fig. 4. Memory Device Development

he next step in digital design. Random-logic gate arrays that eature sub-nanosecond delay for main frame controllers in ext-generation computers are from Japan.

A sub-nanosecond bipolar 8-bit 1600-gate LSI processor was fabricated using novel processing technology and was ombined with three-layer metalization and 120-pin gang lead bonding. An average packing density of 170 gates/mm² has been achieved with an internal gate of 0.6pJ (0.9nsec, 0.67mW) power delay product.

Fig.3 illustrates a cross section of this LSI device. The most significant aspect of the newly developed process, compared with the conventional approach, is that all of the electrodes and the first interconnections are constructed using a poly crystalline silicon (poly-si) layer prior to the formation of the emitter-base junction. Further, poly-si high value resistors, especially suitable for low power consumption LSIs, can be fabricated in the poly-si layer at the same stage as the bottom layer interconnection patterning. Therefore, no area is required for resistors in the transistor array substrate.

This LSI has 120 leads including 12 power-supply pins. For batch bonding of these leads, gang bonding using flexible tape as a chip carrier is used.

2. Denser and Faster Memories

The scale of integration of memory circuits has doubled each year.

Over the last three years, standard dynamic silicon gate n-channel MOS (NMOS) 4- and 16kb RAMs have been supplied by Japanese solid state memory manufacturers. Recently, the technology has definitely been established for reaching the 65, 536-bit level, as shown in Fig.4.

The diffusion self-aligned (DSA) MOS gate structure, generally called DMOS in the U.S., was devised in Japan. This device enables achievement of low-power dissipations and high operating speeds while keeping packing densities high. 4Kb dynamic RAMs with 60 nsec access time were developed using DMOS.

A 64kb dynamic MOS RAM was also reported at the 1978 ISSCC from Japan. It is capable of 200 nsec access time and 150mW power dissipation and has been developed using a single transistor cell and a single-level silicon gate process. It has been fabricated utilizing 2μm-rule fabrication technolog which include 2μm ultraviolet photolithography and 500Å gate oxide. The key electrical parameters of the 64Kb devi are shown in Table 1.

In the bipolar memory area, a fully static 4Kb RAM us poly silicon technology in combination with non-epitaxia growth structure and the local oxidation process was reported.

A cross section of the typical local oxidized non-epi po silicon technology transistor and a poly-si resistor is show in Fig.5. By applying conventional 4μm photolithography t these processes, the size of a single memory cell is significantl reduced to 2,280μ², resulting in a 4Kb RAM chip size o 17.2mm².

3. LSI Process Technologies

3-1. Non Optical Patterning

More important for LSI circuits than device types is fabrication – the ability to build fine device patterns. Electron bea exposure will be one of the most powerful aspects of LS fabrication.

In 1967, the first computer-controlled electron bea exposure system was developed in Japan. This system was th vector scan type. Wafer registration using engraved marks o the detected data was applied to this system.

Improvement of the pattern drawing speed has been carri out for the vector scan system. In 1977, a prototype of th raster scan electron beam system, which was able to sca 50mm square area in one hour, was reported.

Recently, the variable rectangular shaped beam techniq is being developed. This technique has great potential f higher exposing speed.

To utilize ion beams for pattern transfer is also possib and basic experiments are being continued. Since the scatteri range of ion beams is shorter than that of electron bea higher efficiency and less scattering of beams are expected.

Also the X ray pattern transfer projection system is bei studied in Japan.

le 1. Typical 64K RAM Characteristics

Technology	Single-poly cell, N-channel Si-gate
Organization	16k word x 4 bit
Cell size	14μm x 16μm
Chip size	6.1mm x 5.8mm
Access time	200ns
Cycle time	500ns
Supply voltage	+7V, −2V
Operating power	150mW
Standby power	10mW
Refresh	128 cycles/2ms
I/O interface	TTL (including all clocks)

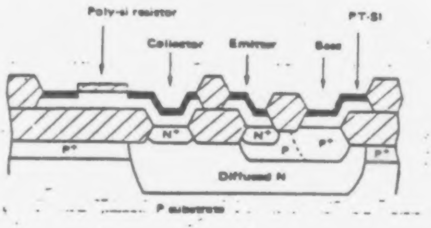


Fig. 5. Cross Sectional View of the Local Oxidized Non-epi Technology Transistor

Assembly Technology

Automated assembly systems to handle LSI chips on the duction line are now common in most Japanese semi-ductor facilities.

For wire bonding, automated IC wire bonding equipment conjunction with a pattern recognition system and a micro-cessor were developed in Japan. The images of LSI chips picked up through a microscope. The processor detects identifies LSI chip images, by performing high-speed relation between the digitized signal and the stored standard tern.

Another approach is the automated tape bonding (TAB) tem. In Fig. 6, an LSI chip, packaged in a low-cost film rier strip, is shown. The bonding of the film carrier lead he chip is done automatically.

3-3. Computer-aided Design

Most Japanese LSI manufactures are utilizing high performance computer-aided design systems. Most of these systems have been developed and used internally in each firm on their own computers.

As for standalone artwork design systems, mainly CALMA, APPLICATION and Computervision, were imported from the US. The circuit analysis program – SPICE, which was developed at the University of California, has been used widely.

R&D activities of computer-aided design technologies are accelerated due to the growth of LSI chip complexity. But there is a problem of rapid increase of computer time caused by increase of design data amount, especially in the layout design and test pattern generation of random logic LSIs. Programmable logic arrys (PLA) may give a solution to the problem.

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lock Coding System for Still Picture Data

he Musashino Electrical Communication Laboratory of T has developed a new block coding system which com-ses the quantity of picture data to approximately 1/8 in conventional PCM systems.

The center to end, still-picture supply service, which retrieves, transmits and outputs data from still-picture data filed at the center on request by users is attracting attention as a new type of picture communication service. The first

WITH EMPLOYMENT OF LASER BEAMS

NHK finds unique way to treble magnetic tape recording density

A unique method to treble the recording density of ordinary video magnetic tapes has been developed by the Japan Broadcasting Corporation (NHK) Technical Research Laboratories in Tokyo.

The new method uses a magnetic head for recording but does not do so at all in reproduction, reading the intensity or weakness of the signal with only light.

The secret lies in making the most of the characteristic of powderized magnetic materials on both surfaces of such tape to gain a greater sensitivity to magnetism as to register even slight magnetic pulses under a high temperature.

Specifically, the recording job is done by casting on a slow-moving strip of tape a stream of laser beams of 3 microns in diameter. The beams are of a very high density type. All parts of the tape where the beams hit are instantaneously heated up to about 120 degrees C., boosting the magnetic powders' sensitivity. A magnetic head to send electromagnetic pulse signals follows the laser bombardment and to mark a continuous swath of recordings in the same width as the beam's 3-micron diameter. The signals are deliberately weakened so that they will not be felt by other parts of the tape.

The reproducing job needs no magnetic head. A special compound crystal made of gadolinium (Gd), gallium (G), and garnet is used. The crystal optically changes its character according to the strength of magnetism. When the crystal is placed in close contact with the moving tape and changes in its optical character are caught, again, by laser beams (through their reflections), all recorded signals can be reproduced.

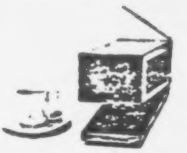
Unlike the conventional magnetic heads for reading recordings, the crystal is capable of reading even those of smaller width than 3 microns if the intermediating laser-beam width is narrowed.

The laboratories have made sure that its new process will make possible creation of 200 tracks per 1 millimeter of the tape width, 10 or more times the conventional methods.

This recording density, in terms of the well-known binary digit signals, means 80,000 bits of information implanted on each square millimeter of the tape surface, about three times the PCM (pulse code modulation)-VTR (video tape recorder) type of such method the laboratories had developed early last year to attain the highest density of the kind ever known. Even five times as much is attainable.

A commercial version of the new method applicable to home types of VTR sets and other video recorders, promising much miniaturization of such equipment, can be developed in about three years, it is believed.

New Products



Sony Corp. of 6-7-35, Kita-Shinagawa, Shinagawa-ku, Tokyo will start marketing in the domestic market from May 21 a ultra-small 4-inch color TV set. The KV-4P1 model—[illegible]—measures 120 (width) x 119 (height) x 280 (depth) millimeters and weighs 3 kilograms, excluding the A/C power adapter. The angle of the body is adjustable steplessly so as to offer easy-to-watch images on the screen. With this new model, Sony hopes further to cultivate the market of "personal TVs." The company last year introduced a 6-inch color TV. The 4-inch TV consumes less power (19 watts in A/C or 12 watts in D/C) and can be powered by four different power sources—household outlet (100 volts), dry batteries (12 V), automotive batteries and rechargeable batteries. Price: ¥99,800.

Shimadzu Seisakusho, Ltd. of [illegible] Kuwabaracho, Nakagyo-ku, Kyoto City has developed a medical mass spectrometer that can measure a maximum of six constituents in respiratory and anesthetic gas on a continuous basis. Such a measuring is made possible by applying the different mass numbers identifying the constituents. The [illegible] model is automatically operated by means of a mouthpiece used by the patient. The device can select the gas constituents whose mass number is below 100 AMU, such as oxygen, nitrogen and carbon monoxide, by changing voltage applied to a quadrupole, according to the company. The machine can check respiratory organs as well as control anesthetization and perform basic physiological and pharmacological studies, the firm says. It plans to sell 20 such machines during the first year. Price: ¥12 million per set.

Machine tool builders —

(Continued from Page 6)

by earmarking an estimated [illegible]-billion budget up to 1985.

Iacocca apparently fears that any momentary hesitation may result in a defeat in a race with its formidable rivals, such as Toyota and Nissan, in revamping facilities and developing new cars.

Meanwhile, grinding machines are posting the best seller items. Nippon Industrial Co. said that grinder orders received from both domestic and overseas automakers have reached a 20-month work load already. In these order backlogs, the company said, are included the contracts worth some ¥1,700 million, made with GM's Opel division in the spring of last year for 35 pattern-grinding and cam shaft grinding machines.

TECHNOLOGY & ENVIRONMENT

Toshiba studies prod. of fixed head type home VTR

A home video tape recorder employing the so-called fixed-head formula, much more compact, simpler and lightweight than the present VHS (video home system) and Beta Format types, is in the stage of being developed for mass production by Toshiba Corp.

The electric-electronic equipment maker said it is the first developer of such a home VTR of fixed-head formula to announce readiness to commercialize such a recorder, although many of its domestic rivals and also BASF A.G. of West Germany and Eastman Kodak Co. of the U.S. had been competing in its development.

According to Toshiba, its new product, specifically known as Longitudinal Video (Tape) Recorder (LVR), in the case of its industrial version, was developed on commercial basis in February, last year and thereafter by the corporation itself and various other competitors. But no other maker seems to have made enough progress to get ready for commercial production.

Toshiba's new product is said to have the following features:

—Two-hour recording, double as long as considered attainable so far for the new type of VTR.

—Simplification and miniaturization of the structure to two-thirds of the conventional VHS or Beta type, in terms of the standard stationary model.

—A random access capacity to start reproduction at any given spot on a recorded tape within a few seconds after switching on.

—An endless cartridge type of taping in contrast to the cassette type for the two conventional makes.

The corporation already has started concentrating on establishing a mass production method for its new product at its Video Business Department from belief that the technological development phase is over. As for the cost and pricing problem, it is sure its new product can underprice the VHS and Beta types when mass-produced.

In its efforts to build a "global family," that is, group of makers adopting its new product formula, the corporation has started consulting many foreign as well as domestic VTR makers.

It has so far found that most domestic manufacturers are passive in response due to the already local sales growth of the VHS and Beta types and the new product's lack of interchangeability of tape with them, but some U.S. or other Western makers are much interested in the new product.

The corporation thus visualizes test marketing of its new product first in the U.S. sometime during next year.

Mitsui E&S's new dehydrator can lower sludge water content to 50%

A dehydrator to reduce the water content in sludge to about 50 per cent has been commercially developed by Mitsui Engineering & Shipbuilding Co. (Mitsui Zosen) of Tokyo.

Conventional sludge dehydrators cut the water content in sludge to only about 75 per cent requiring much fuel oil to burn off the dehydrated sludge cakes (processed mud). The practice has often been ridiculed as "burning off water with oil." If dried to around 50 per cent, such cakes would save much oil and be easier to handle when used for land-fill or reclamation purposes.

Trade-named LAO Dehydrator, it features the use of a pair of high-pressure rolls to do a two-stage dehydration to cut the water content to about 50 per cent. In the primary stage, the water content is reduced to 70-80 per cent, the same level as the conventional equipment with centrifugal and pressurizing devices.

The company is now testing its new brainchild for cost and other data in a pilot plant processing coke oven drains at a steel company. The steel company has found the dehydrator so good that it has already placed an order for the first commercial model of it with Mitsui Zosen. The latter plans to start a full-scale sales campaign when the first model is delivered in autumn. A standard model would be capable of producing 3 tons of dehydrated sludge a day and be priced at around ¥20 million. Sale of a comprehensive system including aeration and incineration facilities is also planned.

The new dehydrator, applicable to all sorts of sludge, including sewer, waterworks water purification, and industrial, uses two kinds of filter belting. The hard belting made of felt, to which sludge does not stick easily, carries the first-dehydrated sludge beneath one set of rollers, which are more than 10 times as powerful as the best conventional dehydrating device.

Moreover, the hard belting runs together with the soft belting underlying it to enhance dehydrating efficiency. The other set of rolling facilities is placed opposite the first one to dehydrate the revolving belts themselves. Simplicity of the whole dehydrator structure ensures low operating cost.

Hitachi produces world's first 16K EEPROM

Hitachi, Ltd. last week announced development of what the company says is the world's first 16-kilobit electrically erasable programmable read-only memory (EEPROM).

According to Hitachi, its new product—Model HN48016—has a fast maximum access time of 250 nanoseconds, faster than the maximum access time of 450 ns of the 2716 family of the ultra-violet ray erasable type EPROM (erasable programmable read-only memory), presently the main product of re-programmable ROM.

Hitachi plans to start its sample delivery from this month. Its sale as a product in volume production will be launched in Japan and abroad from the third quarter of this year. Suggested sample price is $70 in the U.S. and West European markets.

Mainly because of its fast access time, the HN48016 will be applicable not only to areas where the conventional EPROM has hitherto been used, such as in the control program of microprocessors and terminal equipment, but also to such areas as electronic cash registers and banking terminals where there is rewriting on board and it is necessary to preserve data in the event of power failure.

As the EPROM hitherto had used p-channel aluminum gate process technology, the memory capacity had been up to only 8K bits and the fastest maximum access time 450 ns. In order to attain high speed and high density, Hitachi developed its own n-channel silicon gate metal-nitride-oxide semiconductor (MNOS) process technology.

TH

Large traders take up import of semiconductor production mach.

Major trading companies have started entering the market for semiconductor manufacturing machines owing to the recent rapid growth in sales of materials and manufacturing equipment for the integrated circuits along with increasing demand for ICs and large scale integrated circuits.

Japan is catching up with the United States in the field of semiconductor manufacturing machines. The U.S., however, is still far superior to Japan in the field of highly advanced machines, such as electron-beam exposure machines, which are indispensable for making very large scale integrated circuits.

Major Japanese trading companies are placing emphasis on import and sales of these leading manufacturing equipment for electronic products.

C. Itoh & Co. newly has joined the sales competition for the semiconductor manufacturing machines, while Sumitomo Corp. recently established a sales company for such a semiconductor manufacturing machines.

Major trading companies are thus competing against each other in the semiconductor manufacturing machine market far more fiercely than in the past.

Projection mask alignment

Most of the major domestic semiconductor makers still depend on the United States for 60 to 70 per cent of the manufacturing equipment for semiconductors in the pretreatment process, the "core" of the production line of semiconductors.

These semiconductor makers sent their engineers to the U.S. with a view to compete in the development race of very large scale integrated circuits and are carefully watching the trend of new products in the field of U.S.-made semiconductor manufacturing machines.

Trading companies which import these new machines from the U.S. are therefore placing emphasis on collecting information in the field.

Tokyo Electron Ltd., a pioneer of such trading companies, made a rapid business expansion along with the growth of the domestic IC industry and was listed on the Tokyo Stock Exchange in June.

The company was established by a group of companies that separated from Nissho Co. (now Nissho Iwai Corp.) in 1963 when transistors were in their golden age. Traditionally, major trading companies have a difficult time in doing business in this field because it takes time to train experts acquiring high technology for undertaking maintenance for such machines.

Tokuo Kubo, president of Tokyo Electron, says that the scale of the market for semiconductor manufacturing machines has attained the level of ¥100 billion and is expected to grow 20 per cent annually.

With such a bright prospect for the market, major trading companies actively have started business in this field.

Based on a strategy that one trading company deals with one line of production system, the major trading companies are aiming at importing the most advanced manufacturing machines for very large-scale integrated circuits, known as VLSIs.

C. Itoh & Co. bought the sales agency right of Calma Co., a division of UCS and a top maker for computer-aided circuit designing machines, from Nagase & Co. and has been watching for a chance to enter the domestic semiconductor manufacturing machine market.

In June, this year, C. Itoh & Co. started marketing fully automatic direct wafer stepper projection systems imported from Optimetrix Corp. of the U.S.

Except for Mitsubishi and Mitsui & Co., which have no intention of doing business in semiconductor manufacturing machines, most of the major trading companies have started business in the market.

The automatic projection mask alignment systems are designed to draw a sub-micron circuit patterns on silicon wafers with optical processing. Canon Inc. is making strenuous efforts in this field on the basis of its optical technology developed over the years. The United States, however, still has a large market share in this field.

Major Japanese trading companies faced a severe competition trying to obtain the sales agency right to import such mask aligners.

Kanematsu Semiconductor Corp., an affiliate of trader Kanematsu-Gosho Ltd., obtained a sales agency contract with Perkin-Elmer Corp. of the U.S. for its projection mask aligners.

Sumitomo Corp. became a sales agency for GCA Corp. of the U.S. to sell its direct stepping on wafer basic system (DSW).

Optimetrix, headquartered in Mountain View, Calif., was about the only leading U.S. maker of semiconductor manufacturing machines that had no sales agency in Japan.

In dealing with the DSWs which compete with the projection mask aligners of Optimetrix as to both quality and specifications, Sumitomo Corp. established a wholly owned subsidiary Sumisho Electronic Systems Inc. on July 1.

Sumitomo Corp. then eyes strengthening its after-sales service system — a key to successful sales of semiconductor manufacturing machines in Japan. The company intends to attain a total sales of ¥9 billion in the first year and ¥12 billion in the second year in the field of semiconductor manufacturing machines.

E-beam exposure

Major trading companies are also making their inroads into the market of electron-beam exposure systems which are indispensable for making super fine submicron circuit patterns.

Kanematsu Semiconductor now deals with MEBES (manufacturing electron-beam system) model of Perkin-Elmer Etec Corp., which has already sold six of the machinery to major semiconductor makers in Japan.

With GCA Corp. planning to manufacture the similar machine within two years, Sumitomo Corp. will have a competitive product in this field.

C. Itoh & Co., a newcomer in the field, has been making strenuous efforts by negotiating with several of the makers of semiconductor manufacturing machines.

The semiconductor manufacturing machine has been highly advanced technologically and systematized recently with the advent of very large scale integrated circuit era. And only few of U.S. makers of semiconductor manufacturing machines can afford to make investment in plant and equipment and technology development.

Consequently, the market is due to become even more oligopolistic. James E. Gallagher, vice president of GCA, predicts that three or four of the major makers will eventually absorb the small makers in the field in 1985.

The strategy adopted by the major domestic trading companies of importing the latest machines and establishing contacts with U.S. major makers, looks due to benefit them also in the future when domestic makers start making their own products.

These machines are among the highest priced of all the merchandise dealt by the trading companies — with an electron-beam exposure machine priced ¥300 million and a projection mask aligner ¥200-¥300 million.

TDK will become 1st in world in prod. of audio magnetic tapes

TDK Electronics Co. of Tokyo will become the world's largest audio magnetic tape producer this year, outranking BASF of West Germany.

According to the Tokyo company's estimate, the world's production in 1980 will reach 1,270 million reels in terms of the 60-minute type. TDK Electronics will produce a total of 260 million reels in Japan and the U.S., which will account for slightly more than 20 per cent of the world's total production. The market share will be about 2 percentage points larger than 1979's 17-18 per cent, TDK Electronics said.

BASF's share in the world's market in 1980 is estimated to reach slightly less than 20 per cent.

TDK Electronics has been stepping up marketing campaigns in the American and European markets to vie for larger shares there. Particularly in Europe, competition between TDK Electronics and BASF has been intensifying. TDK has become the most popular brand for audio magnetic tapes in Britain.

ELECTRICALS & ELECTRONICS

Toshiba wins E. German order for TV pixtube plant

Toshiba Corp. and trader Mitsui & Co. have jointly won a ¥40 billion East German order for color TV picture tube manufacturing facilities.

This will be Toshiba's second shipment of color picture tube manufacturing facilities to East Europe. The Tokyo electrical-electronic machinery maker exported facilities capable of producing 300,000 picture tubes yearly to Czechoslovakia in 1978.

The two Japanese companies recently revealed that East Germany's Industrieanlagen Import (IAI), an industrial plant import corporation, has said that it would buy the color picture tube manufacturing facilities from the Toshiba-Mitsui team.

IAI plans to install the facilities at the color TV assembly plant in Berlin. Operations of the facilities is scheduled for the end of 1984.

A formal contract is expected to be concluded in September.

The facilities that Toshiba and Mitsui will provide are capable of producing 600,000 picture tubes yearly. They will be available in four versions by size of screen — 16, 20, 22 and 26 inches. Related facilities to produce fluorescent materials, electronic guns and shadow masks also will be supplied.

The Toshiba-Mitsui team will offer operating know-how and help the East German customer operate the facilities in the initial stage.

The Toshiba-Mitsui group has succeeded in winning the order after beating off several competitors, including RCA Corp. of the U.S. and Mitsubishi Electric Corp. of Tokyo.

Toshiba is enthusiastic about selling color TV production facilities to Communist nations. Some time ago, the company sold a color TV picture tube manufacturing plant (with annual production capacity of 960,000 units) to China jointly with Hitachi, Ltd.

Hitachi Maxell to export magnetic tapes to China

Hitachi Maxell, Ltd. of Ibaraki City, Osaka will export 2 million reels of 60-minute audio magnetic tapes to China.

The subsidiary of Hitachi, Ltd. will deliver 400,000 reels monthly during the five-month period, starting October.

The contract was concluded between Hitachi Maxell and Peking's light industry export-import corporation.

Separate from the export deal, Hitachi Maxell is now negotiating with China on supply of magnetic tape manufacturing plants. Four cases of Chinese inquiries for such plants already have been received, Hitachi Maxell said.

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Then there's our South American connection. Starting in September it will be based container single carrier service from Tokyo to Lima, Santiago and Buenos Aires with the introduction of our new wide-body DC-10.

And if your objective is cost/time efficient service to Europe, ask about our sea/air connection. Goods travel via Vancouver, the nearest major North American seaport, and the trip cuts the air-air freight cost by 50% and saves 15-20 days of the all-sea route.

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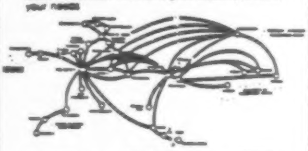

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NIHON KEIZAI July 31, 1980

"SUFER LSI VOLUME PRODUCTION 3-YEAR PLAN 10 BILLION YEN INVESTED IN FIRST YEAR"

The large-scale industry-government project, the "VLSI Development Plan," has completed its basic technology development as of the end of March, and disbanded the VLSI joint laboratory, but its results were transferred recently to a research plan called the "Private Sector Edition of the VLSI Project." This project consists of seven private sector firms organized around a VLSI technology research association, Chairman Shindo Sadakazu, components of which have invested roughly 10 billion yen in the first year, and starting this fiscal year will embark on a 3 year project to commercialize the VLSI research. When this development is completed, finally the purely Japan-made next-generation computer, using VLSI, will have been achieved. The government-private sector joint VLSI development took place between 1976 and 1979, with government subsidies to the amount of about 30 billion yen, private sector investment of about 40 billion yen, total 70 billion yen.

As a result of this early research, 9 types of VLSI equipment, including the electronic beam equipment, were completed, and experimental tests were conducted on 256-bit MOS memory and 1000-gate scale bipolar-type logic. However, there are many

NIHON KEIZAI July 31, 1980

technical processes remaining before large scale production of these things and computers using these things as a base is possible.

This private sector project was started in order to achieve large scale production and to achievement of applied technology. The five companies, Fujitsu, Hitachi, Tosh, Mits, NEC, will pay out to this association this year payments totaling 10 billion yen. This association will provide research funds to the participating 7 companies forming the computer general research laboratory (F, H, Mits, NEC, Tosh), joint research company, the NEC-Toshiba joint information system, F.H.-Mits

Its research objectives will be a combination of the 6 items under the industry-gov't joint project, 1) crystal technology, 2) processing technology, 3) device technology, which are a combination of the 6 items. Process techn. means production process. Device technology means to place the devices into equipment.

The 30 billion yen government subsidy had been funneled to the VLSI Project through the Association. This subsidy will, when the next generation computer becomes a reality will be returned to the national treasury through the same Association. This repayment will be suspended for the three years 1980-82, during which the follow-on R&D of VLSI will be conducted by the private sector project, and it is planned it will be repaid in the five years 1983-87.

[Excerpts from NIHON KOGYO SHIMBUN, August 5, 1981]

In order to promote the research and development of high efficiency new-type semiconductors which are considered essential in securing avant-garde technology for space development and for the development of ultra small-size computers, the Research and Development Association for New Function Elements, a foundation having the status of juridical person, was organized on the 4th (of August) under the chairmanship of Sadakazu Shindo of Mitubishi Electric.

Participating in this new organization are Hitachi, Toshiba, Mitsubishi, Fujitsu, Nippon Electric, Oki Electric, Matsushita, Sanyo, Sharp, and Sumitomo, a total of ten companies. The purpose of this new association is to develop three kinds of new high efficiency semi-conductors: (1) the element capable of computing with ultra high speed; (2) the three-dimensional circuit element; and (3) environment-resistant element.

The Ministry of International Trade and Industry, which is determined to foster the infrastructure technology for future generation industries as a precondition for "the technological nation-building in the 1990's, reportedly opted for this line of organizing research associations in the form of foundation in order to deflect the criticism for overseas, saying "Japan fosters high technology industries under the government-private cooperation."

[Excerpts from NIKKEI SANGYO SHIMBUN, August 5, 1981]

MITI's Industrial Technology Agency is said to have expressed its desire to earmark a total of 100 billion yen or more for the next ten years beginning in 1981 for the research and development of the infrastructure technology for future-generation industries. For the development of new function elements (ultra-? element, three-dimensional circuit element, and environment-resistant enforced element) alone, it is planning to set aside a research budget of about 25 billion yen as a national project. MITI has decided to solicit applicants for the project who will carry out the research and development of the new function elements.

[Excerpts from NIKKAN KOGYO SHIMBUN, August 6, 1981]

The Ministry of International Trade and Industry's Agency for a high speed computer system as a part of the 1981 large-scale project. The plan will become finalized at the Industrial Technology Deliberation Committee and the Large-scale Industrial Technology Committee which are scheduled to meet on the 21st.

As in the case of the research and development of pattern information processing system, a research and development cooperative composed of Fujitsu, Hitachi, Nippon Electric, Mitsubishi, Toshiba, and Oki will be set up to undertake the research and development under the form of a trust. In addition, (MITI's) Industrial Technology Agency and Electronics Research Center will participate as representatives of the government.

This development plan, which will encompass a period of about 8 years and an expenditure of about 30 billion yen, aims at the development of an ultra-high-speed computer which is capable of computing one billion cycles per second, about 1000 times faster than the all-purpose computer currently in use. The core of this development project is the practical application of Josephson joint element, which will exert a great impact on the evolution from the Silicon group elements to a high-speed new element. A full-scale development plan for new elements and new architecture geared to the 1990's is thus under way with the establishment of the Basic Technology Development System for the Future Generation Industries.

[Excerpts from NIKKEI SANGYO SHIMBUN, August 6, 1981]

A national project for "the research and development of new function elements," which aims at the practicalization of next generation semiconductor elements far exceeding the function of the currently commercialized silicon semiconductor, is soon to start. In as much as the project is trying to realize the level of efficiency which cannot be realized even by the currently most advanced Ultra-LSI, it plans to spend a total amount of 25 billion yen in the next 8 to 10 years.

Unlike the case of ultra high-efficiency computer or VLSI development project of the past where there were some technological "textbooks" available in overseas, this project is to explore a totally uncharted area of technology. For this reason, the Ministry of Internation Trade and Industry has decided to introduce "research foundation methods" which is unprecedented, thereby consolidating the efforts of the government and private industries on a long-range basis to push the research and development project.

Any organization wishing to participate in the research and development of new function elements can apply beginning on the 5th (of August), and one day prior to it (the 4th of August). "The Research and Development Association for New Function Elements," a foundation having the status of juridical person, was established. This association was entrusted by MITI's Industrial Technology Agency to carry out the research and development project....

The current members of the Association are composed of Hitachi, Toshiba, Mitsubishi, Fujitsu, Nippon Electric (6 computer companies), Matsushita, Sanyo, Sharp (3 electric appliance companies of the Kansai region), and Sumitomo (which is strong in optical communication) -- a total of ten companies. However, any organization can join it as a new member...

The Association will begin, as a government-entrusted project, the research and development of three subjects: ultra-(?) element, three-dimensional circuit element, and environmental resistant enforced element...

BY VLSI TECHNOLOGY RESEARCH ASSOCIATION

Over 1,000 VLSI technologies will be opened shortly for licensing

More than 1,000 VLSI (very large-scale integration) circuit processes, so far developed between 1976 and 1979 under Japan's government-industry project, will be opened to prospective licensees, foreign and domestic, shortly.

Complete licensing of processes patented or expected to be patented in Japan are scheduled to be started through the private-level VLSI Technology Research Association of Tokyo, it was recently disclosed by the association.

Processes developed under the project include about 1,000 industry-owned types and some 40 industry-government jointly owned types.

Some giant American computer and semiconductor manufacturers, like International Business Machines Corp. (IBM) and Texas Instruments Inc. (TI), have already automatically gained access to the technology under long-standing cross-licensing contracts with five Japanese member companies in the association.

The Japanese quintet long technologically tied up with U.S. giants are Fujitsu Ltd., Hitachi, Ltd., Nippon Electric Co., Toshiba Corp., and Mitsubishi Electric Corp.

The proposed licensings will then cover all the approximately 1,040 processes in the case of all would-be licensees other than those having cross-license contracts with the quintet, whether foreign or Japanese. In the case of those holding contracts, about 40 processes owned jointly by the industry and the Government are also set to be available.

The development has resulted from the joint government-industry project having been successfully wound up at the end of last March. Observers visualize a deluge of applications for such licensings as soon as most of the official licensings of such processes are permitted in about a year to come under the Japanese Patent Law. Accumulated wealth of knowledge under the project has been internationally and domestically considered a "treasure trove" of information vital for future VLSI-related production and technological developments.

The four-year VLSI technology development project, which the Government has invested ¥30 billion in subsidies and the industrial members ¥40 billion in common R&D expenditures, involved seven companies — the quintet named above and Computer Development Laboratories, Ltd. and NEC-Toshiba Information Systems, Inc., both of Tokyo. CDL is joint venture of Fujitsu, Hitachi and Mitsubishi. With the conclusion of the project, the association's Cooperative Laboratories in Kawasaki near Tokyo were dissolved.

According to the agency, during the four-year project, domestic applications for patents on processes developed under the project were concentrated in fiscal 1978 and 1979. Such processes are thus mostly expected to be made public by the Japanese Patent Agency for inspection and challenge by the middle of fiscal 1981.

As for international patenting of such processes, the association plans to have applications filed as quickly as possible because the right of prior application is assured for a one-year period after filing in many other advanced countries.

According to the association, foreign inquiries for licensings are already pouring in to it or its member companies. But since the most important kinds of such processes are yet to be made public, the association expects royalty-involving contracts for licensings concerned to start being concluded only after the middle of fiscal 1980 — after September.

The association cited some 14 most attractive kinds of hardware and software developed through the project — 1) High-speed electron beam circuitry drawing device of mixed electrical-mechanical type; 2) A similar device of variable size and shape-adjusting beam type; 3) Another similar device of electric field radiation electron gun type; 4) An electron beam circuitry drawing software system; 5) A circuitry drawing mask inspection device of electron beam type; 6) A circuitry image light exposure device of step-and-repeat projection type; 7) An extreme ultraviolet ray light exposure device of reflecting projection type; 8) An electron beam image equimultiple transposing device by means of an optoelectrical face mask; 9) An electron beam image reduction transposing device; 10) A high-precision dry etching device; 11) A device analyzing system of laser scanning type; 12) An IC temperature distribution measuring system of ultraviolet ray scanning system; 13) A super-speed pattern generating device; and 14) A basic device for a new structure dynamic memory element.

The association last April launched a three-year project at private level for development of really practicable computer-producing types of VLSI technology on the basis of the project results.

ELECTRICALS & ELECTRONICS

Yokogawa will supply GE with diagnostic devices

Yokogawa Electric Works, Ltd. has agreed to supply General Electric Co. of the U.S. with its new ultrasound medical diagnostic device and allow it to market the product throughout the United States and West Europe.

A marketing contract providing for Yokogawa supplying GE with at least 1,000 units a year of its USonic RT100 is expected to be concluded shortly.

The USonic RT100, only three months since it had been put on the domestic market last May, has proved such a hit that the Tokyo company has already booked orders for 200 units.

Yokogawa Electric Works organized a medical electronics division only sometime ago first by importing and domestically marketing GE's X-ray tomographic equipment.

This division has grown into one of its business supporting pillars, booking ¥12 billion in sales in fiscal 1979.

It thus has decided to further expand its medical electronic business by its sales of the new diagnostic device to America and West Europe. The new device offers a clear image of the interior of the body with a four-stage automatic focusing function.

It is believed that Yokogawa Electric Works and GE have agreed on marketing of the device under GE's brand. Supply of the device will be started as quickly as possible with the immediate aim of delivering at least 100 units by the year-end.

Yokogawa Electric Works is also striving further to expand its domestic USonic RT100 sales by enlisting as many sales agents as possible.

Its division's fiscal 1979 business success was chiefly due to explosive sales of GE's X-ray tomographic equipment. In fiscal 1980, such sales are expected to level off from fiscal 1979, but the division's domestic sales as a whole are to be boosted by more than 20 per cent on the strength of the new product.

Hitachi will form factory in Selangor

Hitachi has obtained approval from the Government of Malaysia to establish a television components manufacturing factory in the State of Selangor.

The new company, named Hitachi Consumer Products (Malaysia) Sdn. Bhd., will be established through the joint investment of the Hitachi Group and the capital participation of the State of Selangor.

Hitachi Consumer Products (Malaysia) will be involved in the manufacturing of main television components such as deflection yokes, fly-back transformers and tuners.

The Malaysian subsidiary has 200 employees.

Operation is scheduled to start in June 1981, with plans to supply the television components not only to the Hitachi Group but also to other television manufacturers all over the world.

With the completion of the television components factory, Hitachi will have a total of three electronic components manufacturing companies in Southeast Asia.

NEC sets up computer foothold in Argentina

Nippon Electric Co. has concluded an agreement with FATE of Argentina to sell small computers in Argentina and Uruguay. FATE is a Buenos Aires company manufacturing and marketing accounting machines, terminals and a variety of controlling systems.

NEC will supply about 100 units of NEAC System 50 computers a year to FATE. They will be sold under the NEC brand. Delivery is scheduled to start in October.

Argentina hardly restricts imports of computers, although Brazil imposes strict import restrictions on finished products. This advantage and the rising demand for small computers in the country are major factors that have led NEC to conclude the deal.

Semiconductors will become 2nd most important electronic export item

Semiconductors seem certain to become Japan's second largest export item among electronics products this year only after video tape recorders, outranking color television sets, which until 1979 had been the largest export item.

These three products are the "strategic commodities" of Japanese electronic machinery manufacturers. The recent sharp rise in exports of VTRs and semiconductors forces them to decide whether they should further step up exports or produce them in importing countries to ease trade frictions.

According to the Ministry of Finance's customs clearance statistics, exports of VTRs during the first half (January-June) of this year rose 110 per cent from the same period last year to ¥173.9 billion. Color TV exports totaled ¥121.2 billion, up 30 per cent, and the export value of semiconductors managed to top those of color TV sets with ¥123 billion, up 80 per cent.

The slowdown in exports of color TV sets is apparently due to the growing production in the U.S. by Japanese producers. The remarkable rise in semiconductor exports owes to the progress of Japan's technology in the field of integrated circuits, which until a few years ago had lagged behind the U.S. The soaring exports of VTRs are because of the fact that Japanese companies have highly advanced techniques that could not be easily caught by their foreign counterparts.

VTRs, priced at ¥130,000-200,000, are highly value-added products along with hi-fi stereo equipment. As the dissemination rate of VTRs in industrialized countries is still low at the single-digit level, demand for them will rise sharply in the future.

Semiconductors have become an indispensable component for almost all kinds of electrical machinery and electronic devices.

Demand for color TV sets seems unlikely to abate in the future as they will play the key role in the home visual information system as a display. Video discs and home computers do not work without color TVs.

The market share of Japanese-made VTRs and color TV sets in the U.S. and Europe is very high. In the case of VTRs, the market share reaches as high as 90 per cent, if those sold under the original equipment manufacturer (OEM) basis are included. The market share of Japanese-made color TVs in the U.S. stands at about 30 per cent, and that in Europe comes to 15 per cent. However, the market share of Japanese-made semiconductors is still low — at 5 per cent in the U.S. and at around 10 per cent in Europe.

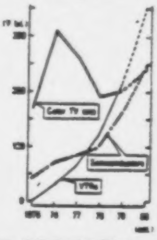
Conversely, the share of American- and European-made VTRs and color TV sets in the Japanese market is almost nil. The share of foreign-made integrated circuits in Japan reaches 20 per cent.

Under the circumstances, these products are vulnerable to trade frictions with importing nations. In the case of color TV sets, seven major Japanese consumer electronics makers already have been producing color TVs in the U.S. They are Matsushita Electrical Industrial Co., Toshiba Corp., Hitachi, Ltd., Sony Corp., Sharp Corp., Sanyo Electric Co. and Mitsubishi Electric Corp. American plants of these companies are expected to produce 3.4 million sets this year, which account for one-third of production in Japan. Some of these companies are going to turn out color TV sets in Britain and West Germany.

As for VTRs, there are no specific plans to produce them abroad. Instead, Japanese makers have been concluding licensing contracts to allow foreign companies to produce them on their own.

In the case of semiconductors, Nippon Electric Co., Toshiba, Hitachi and Fujitsu Limited have been producing integrated circuits in the U.S. And Nippon Electric and Hitachi already have secured production bases in Europe.

Japan's Exports of Major Electronics Products



Notes: (1) Estimations for 1980 are double the actual performance in the first half of the year. (2) Semiconductors are the total of discrete semiconductors and integrated circuits.
Source: Customs Statistics, Finance Ministry

Producers of color TV pix tubes are enjoying extremely good sales

Japanese manufacturers of picture tubes for color television sets are enjoying booming sales.

Production this year is expected to hit a record 19 million units, exceeding the past highest mark of 16.4 million units in 1979 by nearly 16 per cent.

Demand for color picture tubes is strong from domestic color TV makers who have been keeping color TV production at a high level since the latter half of 1979. Also, exports of color picture tubes to Europe have been very brisk. These factors keep color picture tube makers busy.

If the present situation continues, the share of Japanese-made color picture tubes in the world market is expected to reach 35 per cent at the end of this year.

In order to meet strong demand, top makers Toshiba Corp. and Hitachi, Ltd. are operating their plants at full capacity on a three-shift basis. Still, they have large order backlogs. Operation at full capacity is expected to continue until the end of this year, at least.

Japan has six color picture tube manufacturers — Toshiba, Hitachi, Matsushita Electronics Corp., Nippon Electric Co., Mitsubishi Electric Corp. and Sony Corp. Of them, Toshiba, Hitachi and Matsushita have capacity to produce more than 400,000 units monthly. They thus supply a part of their products to other Japanese color TV makers, such as Sanyo Electric Co., Sharp Corp. and Victor Company of Japan Ltd. (JVC), and foreign color TV makers.

Picture tube production gained momentum in March or April last year, said Sumio Hata, director of Hitachi in charge of electronics products production. A video game boom created a big demand for picture tubes. After subsidence of the boom, swelling exports have been supporting picture tube production, he said. In the last half of 1979, Hitachi produced more than 400,000 picture tubes monthly.

Similarly, other makers boosted their production. As a result, Japan's color picture tube production last year hit a record 16.4 million units, up 10.8 per cent over the preceding year.

These makers further stepped up their production from this year in view of strong domestic demand and brisk exports of color TV sets. Output of color TV sets in the January-July period totaled 5,970,000 units, up 21.3 per cent over the same period of last year. Shipments to Europe, Southeast Asia and Latin America have been brisk.

Under the circumstances, Toshiba and Hitachi are now producing picture tubes at a monthly rate of 450,000-460,000 units. Toshiba, in particular, hopes to further raise the monthly production volume to 480,000-490,000 units shortly by increasing working days.

Matsushita Electronics, which supplies products to Matsushita Electric Industrial Co., JVC and other Matsushita group companies, doubled production of color picture tubes in July to 470,000-480,000 units by employing a two-shift formula. The increased portion is shipped mainly to European markets.

Color picture tubes shipped to Europe are mostly 14-inch and 16-inch models, which European manufacturers do not produce. Larger models have been popular in Europe; e.g. 20- and 22-inch ones in Britain and 24- and 26-inch models in continental Europe. Recently, however, demand for smaller models has been picking up remarkably as consumers now buy them as the second or third TV set.

As long as Japan's picture tube shipments to Europe are limited to small models, observers here believe that import restrictions will not develop there. However, optimism is unwarranted because European color TV makers have been getting nervous about massive inflow of Japanese-made sets.

New blood analyzers for use of small hospitals appear on mkt

Japan's medical electronic apparatus market has recently drawn attention for the new blood analyzer products, industrial sources concerned reported recently.

According to the sources, such products are chiefly small or emergency checking equipment, invariably automated to save labor and trouble, and are intended for small hospitals, clinics and practitioner's offices.

Their market are now estimated at more than ¥20 billion in annual demands, with the biochemical blood analyzers accounting for more than half. Domestic sales of such blood analyzing equipment could be expected to grow by two-digit percentages for years to come because all such equipment, clearly showing examination results, are highly reliable, convenient for doctors and are getting increasingly lower-priced, thanks to the progress of automation.

Among makers of the biochemical analyzers to detect liver, kidney and other troubles by measuring the chemical contents' densities in blood, Hitachi, Ltd. of Tokyo (with Hitachi Medical Corp. as its sales wing) is on top, hotly pursued by Toshiba Corp., JEOL Ltd., both of Tokyo, and Shimadzu Corp. of Kyoto.

Until recently, big hospitals were the principal customers of such analyzers, but smaller ones, clinics, and practicing physicians have begun calling for such equipment. Hitachi thus has started miniaturizing and lowering the prices of its analyzers. Last summer, it began marketing its small Hitachi Automated Biochemical Analyzer, Series 705, offering it as convenient not just for minor medical facilities, but even for big ones in case of emergency use.

Shimadzu has also started marketing recently its similar emergency check Diastat CL-Series M1 of bagged and attached reagents free sampling type jointly developed with Toyobo Co. of Osaka. Trying to rollback its lag behind Hitachi and Toshiba in the area of such equipment, the company is also planning to start selling a large model of the same device during this month.

Olympus Optical Co. of Tokyo will also market this month its similar automatic biochemical blood analyzer, Olympus AE3300, introduced last May.

Among the new hematological blood analyzer makers, Omron Tateisi Electronics Co. of Kyoto has recently introduced a new continuous blood corpuscle formation analyzer it is to start selling early next year.

One unique new product is a platelet aggregation analyzer to be marketed this month by Kyoto Daiichi Kagaku Co. of Kyoto. The microcomputer-built-in device will tell how and to what degree blood platelets concentrate, disaggregate and coagulate (as in the case of blood clotting to stop bleeding) and thus tell possibilities of apoplexy, cerebral thrombosis, and other circulation troubles.

ELECTRICALS & ELECTRONICS

Semiconductor makers will boost capital expenditure

Semiconductor makers are inclining toward carrying out an upward revision of their fiscal 1980 capital expenditure plans owing to favorable orders.

The industry's prosperity is attributable to continued strong demands from domestic manufacturers of civilian electronic appliances, including electronic watches, portable and desk calculators, television receiving sets, and video tape recorders and growing demands from domestic makers of industrial electronic equipment.

On top of that, the industry's export prospects as to prices on the U.S. market have grown better.

Until recently, the price of its mainstay export product item, 16-kilobit memory circuit element, had been rapidly falling because of a sharp growth in U.S. importers' unsold inventories.

But this has started turning to level off with the progress of inventory adjusting efforts on the part of American importers.

There is now possibility of a new growth in exports to the U.S., Nippon Electric Co., one of the leading local semiconductor makers, feels.

Hitachi, Ltd. had originally estimated its current fiscal 1980 semiconductor sales (including exports) at ¥165 billion, 27 per cent up from the last fiscal year.

But, according to one of its top executives, sales since the fiscal year have picked up at an even greater tempo and are suggesting a continued upswing toward the end of the fiscal year.

A multi-business electric-electronic manufacturer with large machinery and apparatus sidelines, the company has currently been reviewing its overall business operating policy including the scheduled capital spending projects for this fiscal 1980 in case of Japan's general business recession that could be here sooner or later.

But it is likely to keep intact at least its planned ¥20 billion capital expenditure project for its semiconductor division in the light of such bright business prospects.

Nippon Electric had likewise figured ¥203 billion in current fiscal 1980 semiconductor sales, also an increase of 27 per cent over the last fiscal year. In the case of integrated circuit elements, it has estimated an increase of as much as 28 per cent.

But, according to its vice president, it has "found it necessary to plan an additional capital spending project to expand our semiconductor production capacity because demands are rapidly outgrowing our capacity." The company's current fiscal 1980 capital expenditure project of ¥30 billion for its semiconductor division is thus likely to revised up.

Matsushita Electric Corp. has also come to figure "a 10 per cent growth, even at the most conservative, in its current fiscal 1980 semiconductor sales, over our original estimate."

Sharp Corp. has already expanded its original fiscal 1980 capital spending project by no less than 100 per cent to a new total of ¥8,300 million to launch a second-stage plan to enlarge its new factory producing large-scale integration (LSI) circuit elements.

Toshiba makes hand-size TV set using new liquid crystal system

A hand-size liquid crystal black-and-white television receiver has been announced last week by Toshiba Corp.

The trial model measures 17 centimeters long, 8 cm wide and 1.6 cm thick and weighs only 280 grams. It has a 2-inch liquid crystal screen measuring 3 cm high and 4 cm wide.

Toshiba will exhibit the pocketable monochrome TV receiver at the Electronics Show to be held at Harumi, Tokyo from October 14.

The Tokyo company plans to commercialize the new product in two years. It will sell for less than ¥100,000, Toshiba said.

Several other consumer electronics makers already have been trying to develop a practical palm-size TV set with a liquid crystal screen. However, their attempts so far have not borne fruit mainly because of liquid crystal's slow response speed, unclear contrast between black and white, difficulty in reproducing a half tone. Toshiba has cleared these problems.

Toshiba has developed a metal-oxide semiconductor (MOS) type integrated circuit of which switching elements each correspond to a total of 52,800 picture elements arrayed 220 vertically and 240 horizontally. With this unconventional IC, the liquid crystal's response speed has been elevated to 3/100th of a second, fast enough to reproduce the image of a flying ball in a baseball game.

Also, the contrast between white and black has been elevated to more than 1-to-20

Fuji sells long video cassette tape in Europe

Fuji Photo Film Co. has introduced in the European market a 4-hour video cassette tape based on the Video Home System (VHS) formula.

Fuji Photo Film's introduction of the long recording/playing video cassette tape is expected to have a big repercussion in the European market, where Philips of the Netherlands is trying to push sales of 8-hour video cassette tapes along with its 8-hour video tape recorders.

Initially, Fuji Photo Film's 4-hour tapes will be test marketed by the six Japanese VTR makers belonging to the VHS group, which includes Matsushita Electric Industrial Co., Victor Company of Japan Ltd. (JVC) and Hitachi, Ltd.

From early next year, Fuji Photo Film will market the new product under the brand name of Fuji.

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Gov't eyes 'designating' firms to prevent foreigners' take-overs

With the approach of enforcement of the revised Foreign Exchange & Foreign Trade Control Law from December, the Government has virtually determined the scope of enterprises (government-designated companies) to which restrictions on share purchasing will be applied for defending them against being taken over by foreign capital.

This is because the revised law will decontrol, in principle, all capital transactions.

It is understood that the Government already has selected for such designation six oil companies, including Arabian Oil Co. and Showa Oil Co., as well as Tokyo Keiki Co. (aircraft instrument maker), Fuji Electric Co. (electric machinery maker having atomic power line), Sankyo Co. (pharmaceutical company producing narcotics and vaccines) and Katakura Industries Co. (textile company producing silkworm eggs), or a total of 10.

It is now considering adding Hitachi, Ltd. to this list.

Its selection of the firms is based on those in which foreign capital already has secured an investment ratio of over 25 per cent or is likely to do so shortly, and whose "take-over would have a major impact on the nation's economy or security."

The gist of the coming restrictions will be that a foreign party wishing to purchase the shares of any of these designated companies will be obligated to give prior notification to the Government.

The Government then will screen its application and will be able, if it deems fit, to notify or order "suspension" of such purchase.

On the other hand, from next month, foreign investors will be allowed newly to buy shares of companies whose stock purchases now are not allowed under the present law, if they do not come under the forthcoming designation.

The Government intends formally to make public the names of the designated companies in the Official Gazette, and to enforce the new curb simultaneously with the enforcement of the revised Foreign Exchange & Foreign Trade Control Law from December 1.

In the case of a designated company whose holding of stocks by a foreign investor still has not reached 25 per cent, the advance notification ruling will apply when the 25 per cent line is attained. The ruling will apply immediately to designated firms whose foreign stockholding already tops 25 per cent.

In the instance of a company whose take-over would have grave consequences but whose holding of stocks by foreign investors is so low now that it has not been designated this time, such designation, in principle, will be formalized when the shareholding rate tops 20 per cent in the future.

The revised foreign exchange-trade control law provides that foreigners must give a 30-day advance notice in the following instances:

—When a foreign investor intends to buy over 10 per cent of the shares of a company listed on the stock exchange or an unlisted firm.

—When stock purchases by foreigners in a government-designated company will climb to over 25 per cent of the total issued shares.

Mayekawa decries foreign currency soliciting race

Governor Haruo Mayekawa of the Bank of Japan last week said that financial organs should refrain from engaging in fierce rivalry to solicit foreign currency deposits.

He made the comment at a press conference with regard to the freeing of controls on residents' foreign currency deposits with the enforcement of the revised Foreign Exchange & Foreign Trade Control Law from December 1.

Mayekawa said it was essential for financial organs fully to take into account costs of money procurement.

Excessive rivalry in soliciting foreign currency deposits thus should be avoided, he said.

In other words, he wished that the foreign exchange banks would not go after such money regardless of cost simply for increasing their fund supply.

As to how the increase of foreign currency deposits, whose interest rates have been freed, might affect deposit-savings interest rates which are regulated, the BOJ Governor said this depended on how large the amount of foreign currency deposits became.

From April, 1978, domestic depositors, including companies, were allowed to convert yen up to the amount of ¥3 million per individual into foreign currency and deposit it in such a form.

With the enforcement of the revised foreign exchange-trade control law in December, this ceiling now stands to be abolished.

This means that all of the foreign exchange banks are making preparations to induce individual persons and companies to deposit their foreign currency with them in the form of time deposits.

Since the interest rates of foreign currency deposits are free, there is danger of the deposits being hawked at a high interest for capturing such money.

In fact, the Ministry of Finance had to caution a part of the city banks at the end of September when such a tendency appeared.

Moreover, if a large amount of yen deposits shift to foreign currency deposits, this stands to lead to yen selling-dollar buying with a possible adverse effect also on the foreign exchange market.

TENSIONS LIKELY TO HIGHTEN

EC is urged to boost exports to reduce deficit with Japan

The Japanese Government last week called on the European Communities to try harder to sell more to Japan in order to reduce its massive trade deficits with Japan.

In a statement issued in the name of the foreign minister, it dismissed as "not well-founded" the European criticism that Japanese imports are causing economic difficulties in the EC.

The statement came as an answer to the EC's request for clarification of Japan's policy toward the trade imbalance, made during the recent talks between Japanese chief government representative for external economic affairs Saburo Okita and EC officials.

In acquitting Japan of the damages which Japanese imports are allegedly causing to the EC's industries, the statement said that "the trade balance should be viewed on a global basis the trade imbalance between Japan and the EC should be improved basically by increasing exports from the EC to Japan."

It also said the Japanese Government has been endeavoring to "manage the economy with the due attention to the establishment of harmonious external economic relations," and would continue "the policy of basically pursuing a growth pattern centering upon domestic demand."

The Japanese Government at the same time promised to continue to "advise private enterprises not to export specific goods to the market of any region in a torrential manner."

Nihon Keizai Shimbun's Brussels correspondent Kenji Obayashi reported, however, that the statement, logical and well-founded as it may be, could sound too harsh and insensitive to the European governments given the extremely serious state of their industries and economies.

"It probably will serve to further provoke the European irritation," Obayashi reported. He speculated that the EC Foreign Ministers' meeting toward the end the month looked likely to come up with a tough stand against Japan.

"What the EC Commission was expecting from the Japanese Government was some kind of 'political gesture' that can immediately cool the heightened sentiments against Japanese imports", Obayashi wrote. "EC officials are keenly aware that Europe is basically responsible for the trade imbalance and the plight of the industries, and yet they cannot but appeal for political considerations on the part of Japan," he concluded.

More imported beef will be sold

More imported beef will be released to the public by the semi-governmental Livestock Industry Promotion Corp. at the year-end.

This was decided last week by a meeting of government price authorities in drawing up a six-point program for holding down price rises of daily necessities in the year-end and New Year season.

Such a meeting is yearly held about this time.

As for imported beef, the meeting decided to set the total amount of frozen beef released for sale in November and December at a total of 12,000-15,000 tons (monthly sales in the April-October period had averaged 3,900 tons).

The amount of chilled beef released was put at 3,000 tons, each, for November and December, compared to the monthly average of 2,730 tons in the April-October period.

Scale of 'Tokyo dollar call market' is further to burgeon at rapid tempo in future

The "Tokyo dollar call market" at which foreign exchange banks engage in domestic lending & borrowing of dollar funds is expanding at a swift tempo.

In September and October, the monthly value of transactions topped $19 billion, or an increase of 80 per cent over the average monthly transaction for the preceding year, and an all-time high level.

This is because, amid the bewildering movement of U.S. interest rates and the foreign exchange quotations, large city banks and others have begun actively to use the Tokyo dollar call mart as a place for profitably acquiring or operating their dollar funds.

Moreover, if the enforcement of the revised Foreign Exchange & Foreign Trade Control Law from December 1 leads to an increase in foreign currency deposits, there is possibility of the scale of this market further expanding.

Informants said in this regard that if the Tokyo dollar call market continues to burgeon, this stands to accelerate talks which already are going around in financial quarters in favor of developing Tokyo into an international financing center.

The Tokyo dollar call market was established in 1972 as a place for domestic foreign exchange banks, including the branches of foreign commercial banks, to undertake lending-borrowing operations in dollars. The aim at that time particularly was for supplementing the capacity of local banks lacking wide reputation on their own as yet to procure dollars.

While average transaction volume of the market from the period of the last half of last year to the first half of this year had been around $13 billion, this has begun to increase at a rapid pitch.

Moreover, the greater part of transactions up until last year had comprised overnight or less than a week dealings.

It is understood that lately those of relatively long terms, such as for three months, have come to constitute nearly 20 per cent of the total transactions.

As to this, large operators of short-term funds say that the chief reason is the intensifying movements of U.S. interest rates and the ups and downs of foreign exchange quotations.

The large city banks, they say, have begun to engage in lending and borrowing in the Tokyo market on a full scale from fear that they might not attain what they are aiming at if they raised as in the past on the Euromarket whose time differential reaches close to half a day.

More Japanese concerns are moving to float depositary receipts abroad

Public subscription of bonds overseas by Japanese corporations for increasing their capitalization has been increasing sharply.

Within the course of this year, Taisho Marine & Fire Insurance Co., Nippon Chemical Condenser Co., and Nissin Food Products Co. are planning to boost their capitalization by issuances of European Depositary Receipts (EDRs).

Taking these three together with 10 companies which already have und[illegible] such bond issuance[illegible] total funds procure[illegible] run to over ¥100 billion.

This stands to become an all-time high of flotations, eclipsing the past high set in 1977.

Informants feel that bond issuances by the big enterprises are destined successively to take place in the future, meaning that these corporate bond flotations stand to become an influential means for procuring overseas funds by the Japanese firms along with their issuing of foreign currency-denominated bonds.

In the peak year of 1977, 16 Japanese firms issued depositary receipts (DRs) to procure money amounting to ¥85 billion.

Suspension of bank deals sets high mark

The Federation of Bankers Associations of Japan revealed last week that companies suspended transactions with member banks in October reached the highest mark for this year.

It put the number of cases at 1,573 for corporations having a capitalization of ¥1 million or over.

The figure constituted a 2.5 per cent gain over a year ago.

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SCIENCE AND TECHNOLOGY

DEVELOPMENT OF SEMICONDUCTOR ELEMENTS WITH NEW FUNCTIONS TO BE PROMOTED

Tokyo DENKI SHIMBUN in Japanese 15 Dec 80 p 5

[Article: "To Be Able to Detect Smell and Taste"]

[Text] There is a movement afoot in the Ministry of International Trade and Industry to promote technological development of "new capability elements" which can make a spectacular gain over semiconductor elements of the past to aid the coming evolution of information science to a more thorough and higher level, and this movement is gradually intensifying. This new capability element makes possible the development of a high degree of integration, super high speed operation, and reinforced resistance to the environment sensors suited for various applications. For example, 1) a super small computer which can rest in the palm of the hand is possible, 2) it materializes from a new super high speed transistor which can be used in computers and in communication, 3) it can operate in harsh environments such as in space or high radiation fields, and its use in nuclear reactor equipment control is envisioned, and 4) it can be made to detect smell and taste making it a candidate for opening the way to high level medical measurement technology. The countries of the western world have already made this element the subject of military directed research, and development of this new capability element in Japan has fallen behind. This is why the Ministry of International Trade and Industry has communicated the importance of development of this element to the various industrial nations. At the same time, the government will take the reins to promote its own technological development, and plans will be drawn up and reinforced during the coming year.

Technological development of the new capability element was undertaken because semiconductor technology of the past was thought not able to cope with the high level demands of the rapidly developing information area. The Ministry of International Trade and Industry has taken this viewpoint and has selected this element as a central development theme in the next generation industrial technology development system which is expected to be set up next year. At the same time, the Industrial Structure Council which is an inquiry organ of the Ministry of International Trade and Industry and which is comprised of learned representatives from various industrial worlds presented the report "Development and Problems in the Industrial Structure of the 1980s" in which the development of this new capability element is treated as a subject to be taken up in the new generation technological development.

In any event, this technological development of a new capability element is "a new innovative basic technology which cuts through the limiting walls of semiconductor elements ranging from transistor elements to super LSI and will open a new world for the 1990 decade. At the present time, this new element is expected to provide the industrial base for the next generation, and it will furnish the four capabilities of biochemical detection element, super lattice element, three dimensional circuit element, and environmental resistance reinforcing element.

The biochemical detection element is expected to be a super high sensitivity and super small sensor which can even measure smells and sounds and thereby provide detection not measurable by past technology. Should the measurement of super small materials become possible, the technology will be useful for preventing disasters and pollution at the initial stages. Furthermore, by accurate and rapid detection of certain micro materials in the blood or body fluids, early detection of cancer or hereditary diseases will be possible, and medical measurement technology will be elevated to a high level.

A super lattice element is an element which makes possible super high frequency oscillation, visible laser development, and super high speed calculations. Should this element become practical, 1) a transistor with several hundred times the speed of elements of the past is possible and 2) high sensitivity and high efficiency conversion elements making possible diversification of optical communication will become practical.

A three-dimensional circuit element is, as the name suggests, an element which can handle planar to three-dimensional circuitry and enable high layer capability and provide high degree of integration. This is expected to have the effect of making possible 1) development of a computer which can rest in the palm of the hand (40-50 times the degree of integration compared to computers of the past and 2) a single element can be provided with a number of capabilities (such as measurement, computation, memory).

The environmental resistance reinforcing element is aimed at making possible a computer which can operate in a stable manner in any kind of environment, and it is particularly intended for use in very adverse environments such as in space applications and in high radiation field uses. Its use in nuclear power equipment control computers and robots for use in nuclear reactors is anticipated. It is also expected to find applications in computers to be carried on traffic equipment such as automobiles.

While these many developmental effects can be anticipated, there is urgent need, first of all, to set up a development system for an independent technology to produce these new capability elements. It is the situation that many of the basic patents on semiconductors which make up the core of the semiconductor industry are the property of American industry, and there is a considerable gap in the basic stage compared to the western countries. American industry is putting forth all out development of basic technology, and there are government subsidies in the form of military applications which provide considerable push. It is the situation today that the Americans are a step or two ahead.

In the light of this situation, the Ministry of International Trade and Industry stated 1) a comparison of research and development funds between Japanese industry and western industry shows the latter to have much greater funds and 2) as a result, the government should take the lead to promote research and development and nurture industrial basic technology for the next generation. With this in mind, the cooperative system between the country, academic world, and industrial world will be strengthened, and the government will reinforce its subsidy policy from next year.

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ELECTRICALS & ELECTRONICS

Hitachi and Chinese will establish joint TV firm

Hitachi, Ltd last week signed a contract with the authorities of China's Fujian Province to establish a joint company there for manufacture and marketing of television sets.

The company, named Fujian-Hitachi Television Company, will start operations next March, with full production scheduled for July, 1981.

In three years, the joint venture is to produce 180,000 black-and-white TV sets and 200,000 color TV sets annually with payroll of about 600.

The Fujian and Japanese side will invest in the new company on an equal basis. It [illegible] be capitalized at 3.6 million [illegible] (¥515 million) initially. It [illegible] located at Fuzhou, Fujian Province.

The Japanese side's 50 per cent interest in the company will break down into 38 per cent for Hitachi, Ltd., 10 per cent for Hitachi Sales Corp. and 2 per cent for Tom Sheen, Ltd.

The seven directors of the new company will consist of four Chinese (including the chairman) and three Japanese.

A part of the products will be exported to Southeast Asian countries. Export business will be handled by Hitachi Sales, and domestic sales by the Fujian side.

The joint venture is a limited liability company based on the Law of the People's Republic of China on Joint Ventures Using Chinese and Foreign Investment.

At present, Hitachi is constructing, under contract for the Chinese Government, a color picture tube plant in Xianyang, Shaanxi Province and a color TV plant in Shanghai. With the new plant, Hitachi will further contribute to the development of China's consumer and electronics industry.

Exports of microwave ovens to U.S. showed fall again in Oct.

Microwave oven exports to the U.S. have been decreasing, while the dent is being offset by favorable shipments to South Korea and European nations.

According to the Electronic Industries Association of Japan, microwave ovens exported in October dropped 16.6 per cent from the year earlier level to 34,400 units on a customs clearance basis. The export value totaled ¥2,300 million, down 18 per cent.

With the October figure becoming available, Japan's shipments of microwave ovens to the U.S. during the first 10 months (January-October) of this year totaled 407,100 units, down 23.1 per cent, from the corresponding period of last year. In terms of yen value, they dropped 11.2 per cent to ¥25,421 million.

The marked decrease in shipments to the U.S. is attributable to the dumping suit against Japanese-made microwave ovens raised by the American Home Appliance Manufacturers (AHAM) in July, 1979. Since then, Japanese microwave oven producers have been holding down deliveries from Japan and, instead, started local production. Matsushita Electric Industrial Co., Sanyo Electric Co. and Sharp Corp. started microwave oven production in the U.S. And Toshiba Corp. virtually halted microwave oven shipments to the U.S. market from Japan.

These Japanese moves satisfied AHAM, and the American trade association withdrew its dumping suit. Accordingly, the U.S. International Trade Commission discontinued investigating possible dumping damages.

Meanwhile, Japan's microwave oven exports to the world, including the U.S., totaled 105,100 units in October, up 28.9 per cent from the same month of 1979. They valued at ¥4,782 million, up 15.4 per cent. By destination, South Korea, Britain and West Germany were major customers of Japanese microwave ovens.

Total exports during the January-October period were 0.9 per cent down from the same period of last year at 888,100 units. In yen terms, however, they increased 8.4 per cent to ¥41,819 million.

Pioneer secures exclusive rights to U.S. movie titles

Pioneer Electronic Corp. will get the exclusive right to print nearly 150 titles of motion pictures of Twentieth Century-Fox Film Co. in video disc forms for marketing in the domestic market.

The two companies reached basic agreement on the deal last week in Tokyo.

A formal contract is scheduled to be signed in late January.

Movies are likely to be the best sellers in the video disc's early years.

With the arrangement with the Los Angeles motion picture company, Pioneer, the leader of the optical video disc system group, has taken a lead of the VHD (video high density) group, involving Matsushita Electric Industrial Co. and Victor Company of Japan Ltd. (JVC), as far as the Japanese market is concerned.

Pioneer plans to establish a video disc software producing company in Tokyo in January. The company, tentatively named LaserVision, will be capitalized at around ¥1 billion.

Fujitsu gets UAE order for 100 exchange sets

Fujitsu Limited last week announced receipt of a ¥400 million order from the United Arab Emirates' telecommunications agency (EMIRTEL) for 100 sets of private branch digital electronic exchanges, FETEX-60.

Semiconductor makers' capital outlay will go up 50 per cent

Japan's 11 semiconductor manufacturers are expecting the upsweep in production and sales to continue during the second half of the 1980 business year as it did during the first half, informed local industrial sources reported recently.

Thus, they are planning correspondingly great increases in current annual capital expenditures (investments to expand production lines) even over last year's all-time record.

According to the sources, this year's first-half semiconductor production and sales of the 11 companies were simply excellent. Their combined output swept up as much as 42 per cent over the corresponding period last year. Such an upsweep in semiconductor production reflected a huge increase in exports to the U.S. of computer memory chips, chiefly of the 16-kilobit RAM (random access memory) type, and continuing brisk expansion in domestic demand for other semiconductors including transistors, which are a specialized discrete type. Such domestic demand growth, in turn, resulted from a continuing increase in domestic demand for microprocessors (microcomputers) and a long-lasting increase in both domestic and international demands for home video tape recorders (VTR) whose world production is now 90 per cent concentrated in Japan.

40% more output

In the light of such a boom, which could be traced back to last year or the year before, the sources tentatively figured the industry's annual semiconductor production in the 1980 business year would run up to something around ¥900 billion, 40 per cent up from last year, though so far they have had to piece together either sales or production values provisionally estimated by the 11 makers for such a production.

As for the entire makers' planned current annual capital expenditures, the sources gave a total of ¥170 billion, no less than 50 per cent up from last year, whereas the corresponding total had hit a record peak of ¥110 billion. All the companies have invariably revised their original plans upward since the middle of this year apparently in view of continuing snowballing sales.

The sources also recalled that until a few years ago the semiconductor divisions of the 11 companies had been invariably frowned on by their own people as money-guzzling liabilities. But the picture had changed dramatically by last September when every such division came out as the top earner in each company when eight of the 11 companies provisionally closed their accounts for the six-month period ending that month, the sources said.

These companies' semiconductor export situation has somewhat changed since the start of the current second half of this year, the sources also reported. This was chiefly because of the protracted American recession, they said.

A resultant decline in the hitherto snowballing exports of memory elements, chiefly 16K dynamic RAM chips, to the U.S., their most important foreign market, has resulted in a rapid weakening in international market prices of such elements. In the case of the 16-kilobit RAM chips, the mainstay export item accounting for about 80 per cent of all foreign sales of memory elements, the international per-unit prices, standing at the $6 level at the beginning of this year, were found to have dipped to the $4 level by the middle of this year, and some makes are said to have even fallen off to the $2 level recently.

Most such semiconductors are expensive at the start of marketing because the production yield, the output of products passing quality inspections, is as low as several per cent. But that yield quickly pushes up yearly to send down prices by an average of about 30 per cent a year. The international market prices also go down correspondingly.

But the 16-kilobit RAM type had been an exception to such a price fall pattern for two years until early this year because of a great supply shortage.

The particular type of semiconductor thus has certainly lost its outstandingly high profit margin attraction. But the export slowdown has been more than offset by the growth in domestic demand for other kinds of semiconductors.

Changing production mix

As things stand, some makers are changing their production shares by item. Nippon Electric Co., the largest maker, has already started cutting down by about 10 per cent its 16-kilobit RAM production, while increasing its manufacture of large-scale integration (LSI) chips for making electronic calculators, erasable/programmable read-only memory (EPROM) chips, microprocessors, and discrete semiconductors.

Hitachi, Ltd. is similarly adapting its production, but it is now concentrating on integrated circuit (IC) chips, having stopped production of discrete types. The company is paying more attention to the 64-kilobit RAM type as the potential next generation of the hottest selling semiconductor item.

Toshiba Corp. and Mitsubishi Electric Corp. are building up transistor production to make the most of domestic demands. Fujitsu Ltd., after sharply building its sales chiefly with its memory chips, has turned conservative in its current annual sales prospects for electronic components.

But Matsushita Electronics Corp., Sharp Corp., Tokyo Sanyo Electric Co. and Sony Corp. are expecting continued brisk sales of transistors for VTRs and microprocessors for consumer electronics to keep them at capacity operation as far as the year-end.

Fuji Electric Co. is similarly optimistic, with additional hopes for new products emerging from its recent technological tieup with the Siemens group of West Germany, and its promising solar cell business.

The informed sources, however, said the enormously expanding capital expenditure plans of these companies, unlike last year, now involve complex policy considerations beyond conventional semiconductors. Much of their mounting capital spending projects has been motivated by their awareness of the need for getting ready for tomorrow's mass production of the very large-scale integration (VLSI) elements in fierce competition with one another. VLSI factory construction have already been started by many of them, but such ventures are enormously expensive. Such competitive investments could be a gamble because the VLSI technological prospects are still volatile.

Capital Spending for Semiconductor-Manufacturing Facilities and Semiconductor Production Value

(In billions of yen)

	Plant & equipment investments			Production value			
		1980				1980 (Outlook)	
	1979	Original	Revised	1979	1st half of 1980	Original	Revised
Nippon Electric	27 ([illegible])	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Hitachi	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Toshiba	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Fujitsu	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Matsushita Electronics	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sharp	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mitsubishi Electric	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tokyo Sanyo Electric	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oki Electric Industry	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Fuji Electric	[illegible]	[illegible]	3 ([illegible])	[illegible]	11 ([illegible])	N.A.	[illegible]
Sony	5 ([illegible])	[illegible]	[illegible]	N.A.	N.A.	N.A.	N.A.
Total of 11 companies	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]

Note: [illegible]

TH

14 [illegible] THE JAPAN ECONOMIC JOURNAL TUESDAY, DECEMBER [illegible]

CAN GREATLY LOWER POWER CONSUMPTION

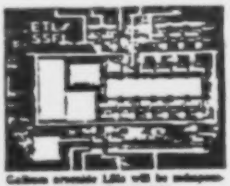
Government laboratory finds way for producing GaAs LSI circuits

A new method to integrate gallium arsenide (GaAs) semiconductor elements into a large-scale integration (LSI) system has been developed by a research team at the Electrotechnical Laboratory, Agency of Industrial Science and Technology, Ministry of International Trade & Industry. The new method opens the way for developing a superfast computer for scientific and technological studies. Gallium arsenide semiconductor elements had been officially eyed by the Ministry as potentially among the best electronic elements for making such a computer. The Ministry plans to open an official program to develop such a computer in Japan's next fiscal year [illegible], starting April 1.

The conventional silicon semiconductor elements are known to be too limited in signal pulse processing speed to meet the needs of the proposed super-speed computers. Besides, they are also known for their heavy electric power consumption and heat generation when worked at too high a speed.

In contrast, gallium arsenide semiconductor elements have been widely recognized for their comparably greater speed of signal processing and far lower consumption of electricity and heat generation. They have so far been applied to making electronic communication apparatus elements for their small power consuming advantages. But their full-fledged application to computers had been delayed due to some tough technological problems.

As a still faster working substitute for the silicon type of semiconductor elements, there is the Josephson element, but it still poses many problems, notably its need for an extremely low temperature of around 270 degrees below zero C. for operation. The gallium arsenide semiconductor element has come to be considered the best possible new computer element to supersede the silicon type.



Gallium arsenide LSIs will be indispensable for super-speed computers.

According to the laboratory, its success in using the gallium arsenide semiconductor known as a Normally-On type, fit for very high-speed computer operations, has been obtained by its research team led by [illegible], its solid-state electronic device research section chief, and [illegible], top researcher.

Integrating the Normally-On type of such elements had required the insertion of a special connecting circuitry called the Level-Shift circuitry between each two elements. Intended for adjusting the difference in electric pressure between each two elements, the particular circuitry had certain drawbacks. It had required a large space because each circuitry unit consists of several diodes and a power source, and it consumed three times as much electric power to operate as each element itself.

This bottleneck was broken by the research team by the application of a special Schottky-effect junction to replace the Level-Shift circuitry. Each Schottky-effect junction unit, replacing each complex-structured Level-Shift circuitry unit, has minimized not just the circuitry space, but the power consumption by great margins.

A trial computer operating unit the research team has built, consisting of 11 elements with a circuitry line width of 3 microns, has proved to require 120 pico-seconds (one pico-second is equivalent to 1/1,000 billionth of one second) per element in signal processing time and 10 to 12 milliwatts in electric power consumption to do such a job.

In the trial performance the unit not only attained the highest working speed ever to be attained with gallium arsenide semiconductor elements, but consumed only about 1/10th the electricity of the latter.

The team is sure that if the operating unit is further refined into a denser concentrated type with a line width of around 1 micron, or less, it is possible to cut down the signal processing time to 50, or even to 20 to 30 pico-seconds, to attain 10 times, or even faster computing speed than the conventional silicon type. The power consumption then could be reduced to just a few milliwatts, also 1/10th of the latter.

A University of Tokyo professor highly evaluated the new achievement for making the most of the high-speed advantages of the gallium arsenide semiconductors to pioneer their application to tomorrow's computer development.

TECHNOLOGY & ENVIRONMENT

Gene engineering patent of U.S. covers extensive area

Japanese industrial interests competitively engaged for years in gene engineering research projects, including pharmaceutical, foodstuff, chemical and biological enterprises, are shocked and dismayed over their recent finding that a series of gene swapping processes recently granted a basic patent by the U.S. Patent Office covers a very wide range of gene engineering technology, informed sources in Tokyo recently reported.

The American patent drawn by Stanford University has been unexpectedly found to cover not just the so-called "restriction enzymes," the basic chemical means to chop every part of DNA to set a growth and development pattern for any living thing, and the so-called "vector" or "plasmid" to carry replacement genes to make microorganisms produce new substances. Such means have been developed by Prof. Herbert W. Boyer of the University of California at Los Angeles (UCLA) and Prof. Stanley N. Cohen of Stanford University. The two pioneers are the joint recipients of the patent.

According to the sources, Japanese consternation is reasonable because gene engineering has been one of the hottest areas for technological development in every advanced country. Such a wide American patent right coverage could result in a heavy limitation on the Japanese freedom to develop new drugs, including cancer cures, new enzymes, proteins and other unconventional products.

The patent has been found to go so far as to cover the genes and cells of all sorts of bacteria and other microorganisms, plants and animals. That means every conceivable variety of gene engineering will be controlled by the patent. What is more, the original patent application filed in 1974 was found to have been revised to include not just the genes of natural life, but even artificially synthetic ones.

In this respect, a veteran gene engineering researcher of Mitsubishi Petrochemical Co. has even suspected an American economic stratagem to monopolize all the free world's gene engineering methods, still essentially in the development stage, either to shut out foreign commercial techniques from the future U.S. markets for unconventional drugs and other products or to bind them by the new patent right.

If Stanford University or the two U.S. professors seek foreign patents of the same kind in Japan and other advanced countries, the situation would be more serious for all Japanese gene engineering industrial interests. In this connection, such Japanese interests are in the dark, whether or not a similar Japanese patent has been sought by the university or scholars.

Under the Japanese patent system, the governmental Patent Agency must keep strictly confidential all pending patent applications for a period of 18 months from the date of application before public disclosure. The worried Japanese industrial enterprises will have to be on the alert for disclosure of possible American patent applications. The agency itself is believed to be in a dilemma if it has accepted the application in line with the U.S. precedent because it has made clear its position that a simple basic kind of technology of wide coverage representing already well-known facts or processes is not acceptable for patenting.

Mass output chance is seen in new flat lens technology

Joint development of a special flat plastic microlens by a Japanese eminent professor and Nippon Sheet Glass Co. of Osaka, will greatly aid development of modern fiber optics communications technology, it was recently learned. The new lens signals the likely low-cost mass production of glass lenses for glass optical fiber lines, a revolutionary means of communication under development.

That means solution of the present problems of high production costs in making the glass microlenses used for the light sources, directional coupler (light beam splitting-linking panel) and other vital portions of the system, Nippon Sheet Glass Co. said. It also means possibility of further miniaturization of such devices, the company said.

According to the company, the plastic lens resulted from joint research efforts with Assistant Prof. Kenichi Iga of the Tokyo Institute of Technology's Research Laboratory of Precision Machinery and Electronics.

The company has developed, as a commercial lens, a cylindrical glass lens of graded index type and a compounded type of lens. Based on the company's technology developed to [illegible] lens, despite its cylindrical form, has the same functions as a convex lens, besides being very tiny and light weight.

The firm is now promoting sales of the two new products for applications to optical fiber communications light sources, directional couplers, inserters, optical switches and light detectors, figuring its current fiscal [illegible] sales of the two items at about ¥3 billion, double the preceding fiscal year.

But the biggest drawback of the two products has been their expense, due to the high costs required in ion exchange and uniform quality-ensuring cutting processes.

Its joint achievement with university scientists is to develop a flat plastic microlens of similar graded index type out of a certain metal-acrylic kind of resin in a semi-molten condition by making the most of the resin's special ion exchange reaction.

The method involved in the achievement can be applied, with some more refinements, to the production of the glass type of lens at low cost. Especially notable is the method's suggested possibility of mass-producing the glass lenses by covering a basic glass plate with a special thin topping material. The company is now

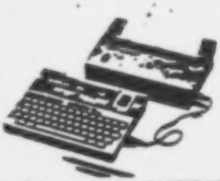
Bendix gets brake tech. for Japanese automobiles

Akebono Brake Industry Co. of Tokyo has decided to extend its technology to Bendix Corp. of the U.S. on producing braking systems for Japanese automobiles.

The Japanese company received right from Bendix to make disc brakes in [illegible], and the U.S. firm later made a capital participation in Akebono. It is now a member of Bendix's international family of manufacturers.

Suffering from the U.S. auto industry's recent production declines, Bendix now has sought reverse technological help from Akebono as part of their business tie-up to make the

New Products



Sony Corp. of 6-7-35, Kita-Shinagawa, Shinagawa-ku, Tokyo has moved into the office automation business by introducing a portable, battery-powered typewriter (bottom) that can be connected with a printer (above). The computerized typewriter, called the Sony Typecorder, shows the typed words on a liquid crystal display and stores these words in digital signals in an audio microcassette tape. The device makes it possible to correct and edit typed words during the text composition

company has also introduced a word processor Series 35, featuring two 3.5-inch micro-floppy disc drives and a high resolution cathode ray tube (CRT) display unit. Both Typecorder and Series 35 will become available only in the U.S. market next summer.

VLSI's Heading for Mass Production in Japan

Large scale production of 64k RAM's, called the VLSI element of the first generation, is being eagerly promoted in Japan. A 64kRAM has 4 times higher integration than conventional 16kRAM's and consequently requires greatly different manufacturing processes than previously, and in turn, putting conventional manufacturing systems out of use. It is recognized that it takes an investment of around ¥10 billion to construct a single production line and thus, at present, the semiconductor industry is becoming completely an equipment industry. Under these circumstances, 6 Japanese makers and 3 foreign-financed makers are competing in constructing plants for production.

Table 1. 64kRAM Production Plants in Japan

Company	Development plant	Mass production plant
Nippon Electric Co.	Sagamihara establishment (Sagamihara, Kanagawa pref.)	Nippon Electric, Kyushu (Kumamoto, Kumamoto pref.)
Hitachi Ltd.		Musashi plant (Kodaira, Tokyo)
Fujitsu Ltd.	Kawasaki plant (Kawasaki, Kanagawa pref.)	Aizu plant (Aizuwakamatsu, Fukushima pref.)
Toshiba Corp.	Transistor plant (Kawasaki, Kanagawa pref.)	Oita plant (Oita, Oita pref.)
Mitsubishi Electric	Kita-Itami works (Itami, Hyogo pref.)	Kumamoto plant No.2 (Nishigoshi, Kumamoto pref.)
Oki Electric	Hachioji plant (Hachioji, Tokyo)	Oki Electric, (Kiyotake, Miyazaki pref.)
Japan Texas Instruments	Hatogaya plant (Hatogaya, Saitama pref.)	Miura plant (Miura, Ibaragi pref.)
Japan IBM		Yasu plant (Yasu, Shiga pref.)
Motorola Semiconductors Japan		Aizu Toko (Shiokawa, Fukushima pref.)

Starting ahead of others for 64kRAM production, Fujitsu is investing totally ¥27 billion in equipment for semiconductor production by adding ¥5 billion in the latter half of 1980. This increment is a first step to build up its Iwate Plant (Kanagasaki, Iwate Pref.) for large scale production of VLSI elements, such as 64k RAM's, following similar efforts at its Aizu Plant.

NEC is aiming at mass production of 64kRAM's at a rate of 100,000 units per month from next spring. The building of the diffusion line No.6 of its Kyushu Plant, in which the company has invested totally ¥10 billion in 1979 and 1980, has recently been completed and at present equipment is being brought in. A test run is scheduled at the end of 1980.

Technically confident for some time of 64k RAM's, Hitachi transferred the bipolar IC production line of its Musashi Plant to its Takasaki Plant in the summer of 1980 and then equipped the Musashi Plant with a 64kRAM mass production line consisting of the latest systems.

Toshiba has recently started construction of Clean Room No.4 at its Oita Plant. The company has decided to make an additional investment of about ¥2 billion in this plant in 1980 and a further large investment in 1981. Clean Room No.4 is scheduled to start operation in the latter half of 1981 for pretreatment processes for 64kRAM's.

Aiming to join the top group for 64kRAM production, Mitsubishi Electric Co. is at present starting production of 64kRAM's at a rate of 30,000 units per month at its Kita-Itami Works. The company intends to complete a 100,000 unit per month production system by putting Ward C of its Kumamoto Plant No.2 into operation in the spring of 1981. It also intends to invest ¥5 billion in the Kumamoto Plant No.2 in 1980.

Oki Electric Industry Co. is making a total commitment to ultra-LSI production and is building a new plant in its 13,000m^2 premises in Kiyotake, Miyazaki Pref. The company intends to complete the building in January 1981 and start operation in the summer of 1981. It will invest totally ¥3 billion in this plant in 1980 and in 1981.

Not only Japanese makers but also foreign-financed makers are disclosing their plans for constructing 64kRAM mass production plants. Texas Instruments, the world's largest semiconductor maker, is constructing a plant in Miura, Ibaragi Pref., intending to complete it this December. The plant is scheduled to start 64kRAM production in the first quarter of 1981.

Japan IBM has already announced its 3-year plan for LSI production at its Yasu Plant in Shiga Pref. and is starting to bring equipment in. Motorola, the second largest semiconductor maker, who have acquired 50% of Aizu-Toko stocks, it seems, will start 64kRAM mass production at Aizu-Toko in two years time.

A 64kRAM has a minimum circuit line width of 3μ and thus requires more difficult techniques for microscopic ing than LSI with a line width of 5μ. This necessitates ive equipment in all processes, including drafting s using electron beams instead of light in mask produc- exposure systems of projection or reduction scale tion types instead of contact types in circuit transcription, otography etching systems using gases instead of liquid als and ion injection systems instead of diffusion es, each unit of such equipment costing several hundred n yen.

spite this, domestic and foreign makers are competing esting in equipment for 64kRAM. This is just because AM is expected to create such huge markets, amounting .8 billion (or ¥360 billion) world-wide in 5 years to

Another important point is that a line width of 3μ to be made available for LSI's instead of the present 5μ will possibly enable LSI production to be doubled by using the same materials and processes as used at present.

A simple calculation shows that more than 300 5mm square LSI elements can be made on a 4-in (or 10.16cm) diameter silicon wafer. This number of 300 can be increased to nearly 900 if the LSI element is 3mm square instead of 5mm square. By completely mastering technology for 64kRAM mass production, a company has the possibility of monopolizing the market by reducing the prices of all LSI products to a third, ahead of other companies. It is here that the secret of companies being so devoted to 64kRAM mass production lies.

ecent Prevalence of 3-Dimensional ransport Systems

ree-dimensional transport systems, which are to natically transport goods and papers to specified locations ecial containers which are run on rails and conveyors, rapidly prevailing. Three-dimensional transportation in ings, consisting of vertical transportation combined with ontal conveyor lines on floors, has been used for more 10 years. On the other hand, literal 3-dimensional trans- systems which, provided conveniently in free layouts aces in buildings and hospitals, are able to automatically port packages, mail and clinical charts any time to fied locations have been rapidly prevailing for about last 3 years primarily in non-industry fields such as e buildings, hospitals and libraries. These systems are cted to widely prevail in industrial fields which deal electronic parts, automobile parts and foods.

ields in Which 3-Dimensional Transport System re Prevailing

he field which most highly introduces 3-dimensional sport systems is hospitals. These systems provided in itals are very advantageous because they are able to matically transport various goods such as charts, X-ray s, test samples, central materials and drugs to any station. y have far greater capacity than conventional air chutes, permit delivery with greater flexibility than conveyors. s, they have longer been prevailing in American and opean hospitals.

Two systems, which represent the latest and largest-scale 3-dimensional transport systems for hospitals, have been installed in the Kobe Central Hospital in the Port Island in Kobe. They are a telelift transport system, with a total length of 2,000m, and a fully-automatic transportation system (transer) which is for hospital meal transport systems.

The telelift transport system is designed to allow an aluminum container, 125mm wide, 405mm long, 310mm high and with a capacity of 10kg, to travel on aluminum rails, externally 196mm wide and 66mm high, at speeds of horizontally 36–72m per min. and vertically 24m per min. In order to deliver a container to a desired destination, it is only necessary to set a station number at the channel provided on a side of the container.

The transer, on the other hand, can be thought of as an enlarged carriage, a 3-dimensional transport system which has ever been made practical for hospitals. It is designed to deliver 28 meals in a steel container wagon (900mm wide, 750mm deep, 865mm long, and weighing 80kg) vertically (to any floor with the aid of shafts) and horizontally (to any nurse station along horizontal lines). It is able to deliver 1,000 meals to 50 locations in only 40 minutes. This is a new system realized by adding a carriage (container or special-purpose car) system to a conventional 3-dimensional transport system consisting of vertical movement using shafts and horizontal conveyor lines combined. Characteristically, it is able to deliver heavy weights, nearly 2,000kg, 3-dimensionally on conveyor lines while supporting them on wagon wheels.

Along with the rapid emergence of 3-dimensional transport systems in hospitals, promoted in the interest of hospital

EEK NTT TYPE CERTIFICATION

More foreign makers hope o market phones & PBX

More American and European companies are going to ter the Japanese telecommunications equipment market long with the Government's licy to "open" the market to reign competition.

The Nippon Telegraph & elephone Public Corp. (NTT) as been promoting entries of oreign communications equipment makers into the so-called "customer-provided equipment" market as well as opening of NTT procurement tenders. Customer-provided equipment comprises telephones, coustic couplers, computers nd other equipment installed y the user, not by NTT itself.

Makers of these equipment ust get NTT's approval before they market them. NTT hecks whether they conform ith its technical requirements.

According to NTT, inquiries ave come in from American nd European makers of telecommunications equipment bout specific procedures to le applications with NTT for ype certifications. During the rst three months (January-March) of this year, there were 10 cases of inquiries from abroad, mostly about telephones and private branch exchange (PBX) systems. The foreign inquirers include International Telephone & Telegraph Corp. (ITT), General Telephone & Electronics Corp., General Dynamics Corp., all of the U.S., Thomson-CSF of France and N.V. Philips of the Netherlands.

Plantronics, Inc., a Santa Cruz, Calif. maker of headsets, data switching and communications equipment maker, already has obtained NTT's type certification for its headphone-type transmitter-receiver units.

NTT expects that applications for type certification from foreign makers will mount in the near future.

In order to meet the growing inquiries, NTT recently published English pamphlets and plans to hold seminars on the Japanese interconnect market in Washington, D.C. and Los Angeles late this month.

items are set for "open" bidding

The Nippon Telegraph & elephone Public Corp. (NTT) ast week chose four items for he second round of its "open" rocurements in fiscal 1981.

They are reactive ion etching quipment, low-pressure CVD chemical vapor deposition) quipment and two types of raphic design systems.

They will be installed at TT's electrical communication laboratories which have een developing very large-cale integrated circuits VLSIs).

NTT has been procuring ome VLSI-related facilities nd equipment from foreign uppliers on a "single-tender" asis. In fiscal 1979, NTT rocured ¥5.9 billion worth of quipment for its laboratories, f which ¥1.4 billion, or 17 items, are objects of the "government procurement agreement" of the Tokyo Round of GATT multilateral trade negotiations. Their suppliers included Applicon of Burlington, Mass. and Varian Associates of Palo Alto, Calif.

mports of ICs rom U.S. in anuary slumped

Japan's imports of digital ntegrated circuits from the .S. came down to a two-year-nd-half low of 14,500,000 chips n January, according to the inance Ministry's customs learance statistics.

Government officials and ndustrymen both fear that the oor January performance ight agitate the American emiconductor industry which as been stepping up criticism gainst the mounting inflow of apanese-made ICs.

Digital ICs account for about wo-thirds of Japan's total IC mports from the U.S.

Imports of American digital Cs had been rapidly increasing ntil a few years ago. Last ear, however, they suddenly lowed down with the average onthly import volume tanding 16,700,000 chips, worth ¥2,730 million (down 14.2 per ent from the preceding year).

Japan can take big duty cut, says Inamori

Even if the Japanese Government cuts import duties on integrated circuits from the present 10.1 per cent to nil, the Japanese semiconductor industry will be able to withstand it, said President Kazuo Inamori of Kyoto Ceramic Co. in an interview with the Nihon Keizai Shimbun recently.

His company is a major supplier of IC ceramic packages both to Japanese and American IC manufacturers.

The U.S. semiconductor industry has been stepping up its criticism against massive exports of Japanese-made ICs. The U.S. Administration reportedly is going to propose to the Japanese Government lowering of both Japanese and American semiconductor import duties to a level of 4.2 per cent in 1983 or 1985 from the present 10.1 per cent for Japan and 5.6 per cent for the U.S.

In order to silence American criticism, Inamori said, Japan should take a bold step, if not complete elimination of import duties.

Specifically, the 49-year-old president urged Japanese semiconductor makers further to step up production at their plants in the U.S. and promote import of American products. Creation of a complementary relationship will ease "frictions" in semiconductor trade between the two mutually dependent nations, Inamori said.

ELECTRICALS & ELECTRONICS

Component concerns are starting to cut in-house IC and LSI prod.

Japanese producers of "electro-mechanical products" (such as video tape recorders, cameras and copying machines) have started holding down in-house production of integrated circuits and large-scale integrated circuits mainly because of snowballing development costs. ICs and LSIs constitute the core of electro-mechanical products.

Recently, several electronic components manufacturers have discarded or suspended their earlier plans to mass produce semiconductors for their own use. Canon, Inc., a leading maker of cameras and copying machines, has decided on a policy of producing only very special semiconductors. Instead, they will procure ICs, LSIs and other semiconductors from specialized makers.

Development of new LSIs now cost several tens of billions of yen a year. This can be hardly met by a single producer of electro-mechanical products. Even specialized semiconductor producers are now trying to limit production items in order to save development investments.

Under the situation, possibility is very strong that a limited number of large makers with huge investment funds will control the semiconductor business in the future.

TDK Electronics Co., a Tokyo producer of magnetic tapes and ferrite products, had been aggressively tackling in-house production of semiconductors. It once set up a semiconductor manufacturing company jointly with Fairchild, but TDK-Fairchild Corp. was later dissolved. Recently, however, TDK has changed the policy and is now placing stress on development of application and peripheral technique rather than semiconductors themselves.

Alps Electric Co., a Tokyo producer of tuners, switches and volume controllers, has given up a plan to mass produce semiconductors.

Pioneer Electronic Corp., which plans to raise the ratio of in-house semiconductor production to 20 per cent in a few years from the present 7-8 per cent, will limit its in-house production to items whose designing and production can hardly be entrusted to other companies because of secrecy and other reasons.

Sony Corp. is now observing the principle to hold down consumption of semiconductors it produces for its own to around one-third of the total consumption.

Matsushita Electronics Corp. plans to hold its semiconductor-related plant and equipment expenditures in fiscal 1981 at the previous year's level of around ¥23 billion.

In sharp contrast, Nippon Electric Co. (NEC), Hitachi, Ltd., Fujitsu Limited and other major semiconductor makers are trying to further boost production. The combined total of plant and equipment investments of the 11 major Japanese semiconductor makers is estimated to reach ¥170 billion in fiscal 1981 on a construction basis, up 30 per cent from the preceding year.

They hope to mass produce and mass market their semiconductors in order to recover the huge investments. The mounting "supply pressure" makes semiconductor users feel it costly to continue in-house production.

Another factor that discourages semiconductor users is the difficulty in securing technicians talented in the semiconductor field.

Electric machinery companies' capital expenditure will grow

Plant and equipment investments planned for fiscal 1981 by 103 major Japanese producers of electrical machinery, consumer electronics and electronic components will increase 13.6 per cent from the preceding year to ¥780,861 million, according to a survey of the Nihon Keizai Shimbun.

The rate of increase, though smaller than fiscal 1980's 40.7 per cent, is larger than the all industry average of 8.7 per cent. The electronics-electrical machinery industry is one of two industries whose fiscal 1981 capital spending will increase more than 10 per cent, among the 17 categorized industries, along with the steelmaking industry (27.0 per cent).

Of the 103 companies surveyed, 57 plan to invest more money for expanding or streamlining their plants and equipment.

The biggest spender is Hitachi, Ltd. which earmarked ¥80 billion, up 2.6 per cent, for capital spending in fiscal 1981, started April 1. Hitachi was followed by Matsushita Electric Industrial Co. (¥70 billion), Toshiba Corp. (¥48 billion) and Sanyo Electric Co. (¥38 billion).

The survey was carried out on February 1. However, figures for Fuji Electric and Mitsubishi Electric were revised as they later announced their specific plant and equipment plans. (Please refer to JEJ March 17 issue for the general outline of the Nihon Keizai survey.)

Plant & Equipment Investment Planned for Fiscal 1981 by Electric Machinery Makers

[illegible]

Output of air conditioners is due to record decline of 40 per cent

Production of home air-conditioners for sale in the domestic market in the 1981 freeze year (October, 1980-September, 1981) will plunge 40 per cent from the preceding year to 2 million units.

Japanese air-conditioner makers still suffer from the lingering adverse effects of the 50 per cent increase in electricity charges in April, 1980 and the unusual cool summer in 1980.

It is estimated that they have inventories of 1.2-1.3 million units.

These makers had been enjoying booming sales until the 1979 freeze year. Sales exceeded 3 million units in the 1978 freeze year to reach 3.15 million units. The sales volume further increased to 3.3 million units in the 1979 freeze year.

On the strength of these favorable performances, they predicted that demand in the 1980 freeze year would rise to 3.5-3.6 million units and actually produced 3.4 million units. Then, they faced the marked slowdown in demand.

Makers are very pessimistic about sales in the current freeze year. "Production will be halved," says a Toshiba director. "We've been greatly cutting production," says a Mitsubishi Electric spokesman.

According to the industry association, 43.5 out of 100 Japanese households had an air-conditioner as of last September. The dissemination rate already is considerably high, making an optimistic demand projection unwarranted.

[Excerpts from DEMPA SHIMBUN, April 23, 1981]

As subsidies for the Development Promotion of Electronic Computers, which came to have a significant meaning in the subsequent development of Japan's electronics industries, a total of 57.1 billion yen was spent during the period of five years ending at 1976. This (subsidy) system was established with the purpose of "speedily strengthening the foundation of our country's electronic computer industries." Specifically, however, it was aimed at the twin purposes of developing electronic computer-family-series so as to counter the 370 series and of developing surrounding terminal equipment, the commercialization of which lagged behind.

In order to receive subsidies under this system, Fujitsu, Fujitsu Research Center, Hitachi Manufacturing, and Hitachi Machine Tool Industries organized among themselves the Technological Research Association for the Development of Ultra High Efficiency Computers: Nippon Electric, Toshiba, Nippon Business Automation, and Nippon Data Machine organized the Technological Research Association for New Computer Series; and Mitsubishi, Mitsubishi Research Center, and Oki Electric organized the Technological Research Association for Ultra High Efficiency Electronic Computers.

The total amount of subsidies given in 1972 was 5.213 billion yen, but it increased to 11.943 billion yen in 1973. 50% of the expenses incurred by the three groups (the Technological Research Associations) in the development of the third and fifth generation computers was supposed to be granted as subsidies, and a request for 10.91 billion yen, more than twice the previous year's, was granted in 1973.

NIHON KEIZAI

April 30, 1981

Brakes are Being Applied to the Inhouse Products of Semiconductors

Need for Huge Development Capital Investments a Factor

The IC and the LSI which are the core of megatronics increased use of electronics in machinery).

Booming inhouse IC, LSI production has had brakes applied. TDK and Alps Electric have one after the other changed their inhouse manufacturing policy and have confined themselves to R&D. Canon is manufacturing only special semiconductors inhouse. Unless they limit inhouse production, they will have to continue to expend funds for R&D which would exceed 10 billion yen per year. Moreover, the retention of skilled technicians is becoming a serious problem. Even the makers who specialize in selling semiconductors *outside* have been limiting kinds of lines they handle to cut back on their ever increasing R&D funding. And the possibility has increased that the semiconductor business hereafter will fall into the hands of the few large makers who have enormous capital funds.

TDK, which because of its joint venture with Fairchild, has positively considered the inhouse manufacturing of semiconductors. However, they have come to the conclusion that it is not good policy to confine their production to inhouse needs for semiconductors. So they changed their business policy to confine their efforts to R&D and the practical applications of semiconductor manufacturing technology. And this is a change of tactics from that of semiconductors per se to the technology surrounding semiconductors.

Alps also has given up large scale production of semiconductors and Canon has limited its involvement with semiconductors to production for R&D only. According to the President of Pioneer, Pioneer will raise their inhouse production from the present 7-8 percent to 20 percent in 2-3 years, but the focus of this inhouse production will be on design and the kind of production that they cannot turn over to others. Even at Sony the inhouse production will be about 1/3 of their total consumption of semiconductors. At Matsushita, the budget for semiconductor related capital investment will be held in 1981 to that of the previous year, namely 22 billion yen.

Inhouse manufacture of semiconductors which until recently has been booming, has now begun to cool. But this is because semiconductor business requires large amounts of capital. On the other hand the 11 large makers of semiconductors including NEC, Fujitsu, Hitachi, the leading semiconductor makers, are to invest close to 170 billion yen in the factory/engineering base for 1980 so far, a growth rate that is over 50 percent. As the capital investment of the leading specialized makers booms, they must continue large-scale production and large scale sales. If they cannot continue large-scale sales they cannot get a return for their capital. As a result, the pressures on these large-scale makers to supply has increased. According to director of Tokyo Sanyo, Iawase,

> "If we invest 100 x 100 million yen this year we have to sell 300 x 100 million next year or we cannot make it. This is the reality. As a result the tendency is to put pressures to increase sales."

As a result, since the weak, small, nonspecialized makers cannot make ends meet solely by inhouse production, they have to think of outside sales, but they cannot compete with the large scale makers in this activity, and so if they are not careful, they run the risks of plunging themselves into a quagmire. Moreover, the retention of technicians is becoming difficult because their numbers are limited, and thus they are in a position where it is impossible to get the technicians needed when large scale production is contemplated.

For the above reasons the boom for inhouse production had icewater poured on it. And so from here on the large scale production of semiconductors will fall more and more into the hands of the large makers, and the large users of semiconductors, such as the machinery and electrical makers will move toward designing semiconductors and in the R&D field, toward, thus creating a division of labor.

[Excerpts from Nikkei Sangyo Shimbun, May 22, 1981]

A government-private joint project to develop the IC technology which can perform information processing with ultra high speed will be inaugurated this fall. This joint project, which aims at the application of IC technology to practical use through optical semiconductors, will be undertaken by the Ministry of International Trade and Industry and the members of the Optical Industry Technological Promotion Association, which include Fujitsu and Tokyo Shibaura Electric.

A joint research institute will be established for this project, and the target date for the establishment of the manufacturing technology is slated for 1986. In the field of semiconductors, a government-private joint project has already reaped a great success in developing Ultra LSI. The proposed project is thus to become a second bombshell.

The joint research institute will be housed in the Fujitsu's research center located in Kawasaki City, and its activities will begin on the first of October this year. The institute will have 25 researchers, 50 personnel including managers, and a budget of 1 billion yen a year. Kenji Sakurai, the former Chief of the Electronic Section of the Research Institute of Electronic Technology of MITI will become its director. Also, it has been decided that three researchers each from the seven participating members of the Optical Industry Technological Promotion Association--Nippon Electric, Fujitsu, Hitachi, Mitsubishi, Sumitomo, Matsushita, and Toshiba--and the MITI will participate in the project.

[Excerpts from NIKKAN KOGYO SHIMBUN, June 17, 1981]

The Ministry of International Trade and Industry is reviewing its plan to establish in 1982 a "IC Design Center" (a temporary name) which performs IC designing on request. The main functions of the center would be to fulfill a wide range of custom IC needs of the medium and small enterprises who cannot satisfy their needs from the existing mass-produced IC's and to play the role of a consulting center for the entire field of IC technology. As for the scope of its operation, MITI is thinking of limiting it to a partial function of the Small and Medium Industry Service. However, because custom IC users' demands include not only designing and experimental production but also fixed scale production, there is a good possibility of expanding the center's operations to include functions from designing to manufacturing.

'I IT

VING WAY FOR PRODUCTION OF VLSI

ITT makes swift, super precision lectron beam exposure system

Nippon Telegraph and Telephone Public Corp. (NTT) has announced development of a super-precision electronic circuitry drawing electron beam exposure device.

It is said to be capable of drawing a circuitry element 0.5 microns in line width at a speed of only 1/10th of the best so far known.

NTT's new device is named EB56. It was created at its Musashino Electrical Communication Laboratory in Tokyo and intended for production of submicron circuit elements with capacities of between 1 megabit and 4 megabits on a substrate a few millimeters square in size. Above the submicron level, LSI (large-scale integration) types of such circuit attaining 2 microns in line width and 64 kilobits in memory capacity are already being commercialized. More sophisticated 1-micron line width, 256-kilobit capacity types are also being produced commercially on trial basis.

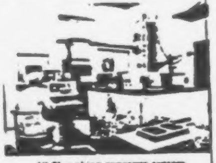
Various similar submicron circuit electron beam exposure systems have already been developed as trial devices in Japan or elsewhere.

But all have fallen short of being commercialized because even on a 10-centimeter square substrate, it has taken 10 hours or even longer to do each round of drawing job.

NTT's EB56 system has solved such a time-consuming problem by making it easy freely to change the cross-section picture of the beam and introducing a special Vector Scanning System to restrict the beam exposure to only where it is really needed.

Moreover, its beam accelerating voltage is set at 20 kilovolts, 1.5 times the best known equivalent, and its pattern drawing precision was brought to only 0.1 micron in error range.

NTT believes its new achievement has at least opened the way for a decided advance in Japan's VLSI developing technology though it still needs various accompanying new processes, including that of producing condensed lining of the circuits.



VLSI-making exposure system

Small enterprises lack funds to practicalize their technologies

Japan's smaller enterprises are mostly handicapped by their inadequate financial capacities and shortage of personnel from making the most of new technological ideas or new products they have developed.

Such a disappointing picture of research and development of minor enterprises, recently was made public by the Center for the Development of Research & Development Oriented Enterprises. The organization, better known as the Venture Enterprise Center (VEC), is a non-profit monetary foundation to help finance venture businesses and others through guaranteeing their bank borrowings.

According to its report, the center's recent checks of 80 firms through interviews brought the following:

—A predominant 66.2 per cent of the firms each had only five or even less research and development specialists in their employ.

—Thirty-one point eight per cent of them spent less than 2 per cent of their annual operating profits for research and development, and a 20 per cent 5 to 6 per cent.

—Sixty point five per cent admitted problems encountered in building markets for new products they had developed, including insufficient fund-raising capacities (6.3 per cent), lack of confidence in their own capacities to keep developing technology concerned (11.6 per cent), and difficulties of building the sales of such new products due to emergence of rival products (11.6 per cent).

The institute registered only 10 cases of loan guarantee totaling ¥264 million during fiscal 1980, a clear indication of such enterprises' lack of investment enthusiasm. The institute will thus review the way it has so far been operating to aid such enterprises.

Pollution-free metal casting process: Hitachi

Hitachi Chemical Co. has developed a new method of metal casting featuring the use of special sand particle binder and hardner that promote rapid removal and recycling of the used sand. The process thus is completely free from pollution.

According to the leading chemical company, its HG Process of making and breaking metal casting sand molds, the chemical HG Binder, and the chemical hardner, all results of joint research with its parent, Hitachi, Ltd. of Tokyo, are possibly without precedent. The new method will be licensed and the binder and hardner sold in Japan from this month, the company said.

The best known conventional method has been to shape a metal mold by mixing liquid or soluble glass in sand and solidifying the mold with a carbon dioxide gas. But the method has had two drawbacks — much time was required to break up and remove sand from the finished product and it was difficult to recycle the used sand.

There are two other known methods — a fluorocarbon-peroxide binder and sulfurous acid gas hardening process, and a phenol isocyanate binder and amine gas hardening process. But these methods are environmentally polluting because the two kinds of gas are poisonous or odorous.

The company's new method using carbon dioxide gas cuts down the sand breaking and removing time to only one-fifth of the first of the three methods, emits no polluting gas and permits reuse of the sand repeatedly. Besides, there is no metal affecting nitrogen or sulfur content in the binder or hardner, respectively priced at ¥300 and ¥50 a kilogram.

SCIENCE & TECHNOLOGY

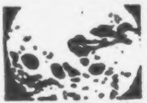
Gov't laboratory turns out powerful laser microscope

A new laser beam-illuminated microscope with far greater resolution than conventional electric or optical types, has been developed by the Electrotechnical Laboratory, Agency of Industrial Science and Technology, Ministry of International Trade & Industry.

According to the laboratory at Tsukuba, northeast of Tokyo, the laser microscope was developed by its research team led by Daisuke Kato, chief electron researcher, under the laser-utilizing cancer diagnosis and therapeutics research project subsidized by the Science & Technology Agency.

Though its beams are guided onto the object specimen through an optical fiber line, the laser microscope works on the same principles as conventional optical microscopes. But the monochromatic (single color) and highly brilliant characters of the laser beams make a great difference in imaging any part of the specimen in contrast with others of conventional microscopes.

With Tsukuba University's cooperation, Researcher Kato has succeeded in photographic imaging, with the new microscope, of animal stomach and intestinal tissue specimens in precancerous conditions down to clear intra-cellular details beyond the resolving capacities of the conventional microscopes. He has envisioned extensive applicability of the new microscope to industrial and other areas than the medical and biological field.



Intestine tissue picture taken by laser microscope

Strong concrete is produced by various innovative methods

A number of innovational concrete-producing methods has come to be commercially developed or applied as to greatly improve concrete and its uses.

This is also just before this month's introduction of the Revised Construction Standard Law featuring far greater demands than before for earthquake-resistance qualities and designs of all new architectural establishments to be built in Japan.

For many years past, Japanese construction and civil engineering experts have been complaining of a "decade-long" international lag in Japan's innovation of its own concrete-producing technology, especially as to the interrelations among cement, water and aggregates. The new series of local technological developments would not just meet such complaints, but would be a big boost to the Japanese cement and ready-mixed concrete supply industries.

The most conspicuous of all such new concrete-producing ways recently announced is the S.E.C. (Sand Enveloped with Cement) System method developed by [illegible] Engineering Co. (Refer JEJ-May 26 issue.)

The biggest merit of the method is to vacuum-process the surfaces of all grains of sand before mixing with cement to remove the air covering around each grain to ensure far better attachment between sand and cement than the conventional blending methods. A pasty kind of sand-cement matter thus created promotes great strength and aggregate mixing uniformity of the resulting concrete and minimizes air and water deposits under steel frames or ferroconcrete steel rods in concrete structures that invite disintegration by earthquake shocks or some other forces.

Although not quite new, some high-efficiency water-reducing and yet adequate soft cement liquidity-ensuring methods of producing concrete have been developed and applied in the past few years by Kao Soap Co., Nisso Master Builders Co., and Fujisawa Pharmaceutical Co.

Such methods, featuring the use of special types of water consumption-reducing cement liquefying chemicals, had once been applied only to sophisticated jobs requiring very great strength of concrete structures or products. But they have recently come to be used widely in general construction and civil engineering jobs. During the past four years, demands for such liquefied cement concrete have increased 30 times.

Kajima Corp., together with Sumitomo Metal Industries, Ltd., has recently developed the world's first carbon fiber-reinforced kind of concrete based on cement mortar. The lightweight and easily moldable concrete is fit for building wall and floor constructions.

Pacific Metals Co. has recently developed its own Dual Mixing System concrete mixer that saves the cement consumption by at least 5 per cent and yet ensures the same strength of concrete compared with the conventional concrete producing methods.

The machine producing soft cement mortar and soft concrete simultaneously in two parallel-working sections blends the finished mortar and concrete into the ultimate concrete after mixing pebbles and a uniform-mixture chemical with the mortar. The mixer sharply improves the dispersion of cement particles and liquidity of soft cement and thus saves cement just as much as it saves water consumption.

Direct forein investm't —

(Continued from previous page)

[illegible] Corp (U.S.)	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

ELECTRICALS & ELECTRONICS

Japan, U.S. makers vie in semiconductor machinery

—Offer newest VLSI devices—

With the coming of the so-called "VLSI (very large-scale integrated circuit) age," Japanese and American semiconductor-manufacturing equipment makers are competing with each other to obtain larger shares in the Japanese market with their newly-developed models.

Specialized VLSI-making equipment have been developed in succession as semiconductor makers demand machines which can meet stricter requirements in precision.

As the Japanese semiconductor industry is expected to invest more than ¥200 billion for plant and equipment in the current fiscal 1981, marketing rivalry among these producers will intensify further.

Japan's semiconductor-manufacturing equipment market, now standing at an estimated ¥140 billion, is expected to grow at an average yearly rate of 20-30 per cent in the coming several years.

Anelva Corp. seems running ahead other makers. The Fuchu (Tokyo)-based company earlier succeeded in developing a reactive-ion dry etching equipment (ILD-4002) which can etch circuit patterns in a 1-micron width on a silicon wafer. It is the world's first commercial VLSI etching machine, an Anelva executive said. Anelva is a joint venture between Nippon Electric Co. (NEC) and Varian Associates of the U.S.

Applied Materials Inc. (AMT) of Santa Clara, Calif. also has started receiving orders for its plasma etching equipment (AME8100) through its Tokyo subsidiary, Applied Materials Japan K.K. AMT reportedly spent some ¥1 billion for development of the machine.

GCA Corp. of Bedford, Mass. and Perkin-Elmer Corp. of Norwalk, Conn., which are the Big 3 of American semiconductor-making equipment manufacturers along with AMT, also are planning to market their VLSI etching equipment shortly through their Japanese agents — Sumitomo Corp. and Kanematsu Semiconductor Corp., respectively.

In the field of exposure systems for printing circuit patterns on silicon wafers, GCA has been far outstripping other producers with its Stepper DSW model. Recently, however, new entries are conspicuous. Optimetrix Corp. of Mountain View, Calif. has started marketing fully-automated direct wafer stepper projection systems through its agent C. Itoh & Co.

Canon, Inc., a producer of mask aligners, and Nippon Kogaku K.K., a producer of exposure equipment, recently bared plans to build specialized VLSI-manufacturing equipment plants to make a full-fledged entry into the promising market.

Major Semiconductor Manufacturing Equipment Makers Handling Specialized VLSI Production Machines

Producers	Dealers	Products
Anelva	Anelva	Reactive ion dry etching equipment
Applied Materials Inc. (AMT)	Applied Materials Japan	Plasma etching equipment
Perkin-Elmer	Kanematsu Semiconductor	[illegible]
GCA	Sumitomo Corp.	[illegible]
Optimetrix	C. Itoh & Co.	Direct wafer stepper projection systems
Canon	Canon	Mask aligners
Nippon Kogaku	Nippon Kogaku	Exposure equipment

Note: [illegible]

Semiconductor industry will develop into ¥1 trillion business in FY 1981

Japan's semiconductor industry will become a "¥1-trillion-a-year industry" in the current fiscal 1981, rivaling color TV sets and video tape recorders.

A Nihon Keizai Shimbun survey recently revealed that production of semiconductors, including integrated circuits (ICs), by the nation's 11 major manufacturers will rise 27.1 per cent from the preceding year to a value of ¥1,128.6 billion in fiscal 1981.

Among the 11 companies, Oki Electric Industry Co. is the most aggressive toward the fiscal 1981 production. It plans to start operation of its 64-kilobit dynamic random access memory (RAM) plant at Kiyotake, Miyazaki in August. The plant is expected to turn out 200,000 chips monthly from the outset. On the strength of the bold plan, Oki's semiconductor production is estimated to rise 62 per cent from fiscal 1980 to ¥35 billion.

Matsushita Electronics Corp. follows Oki in terms of the increase rate in production. The affiliate of Matsushita Electric Industrial Co. plans to raise semiconductor output 30 per cent to ¥120 billion.

Top maker Nippon Electric Co. (NEC) will raise production 21.6 per cent to ¥285 billion.

Under the situation, Japan's share in the world's semiconductor market will further rise in fiscal 1981 from fiscal 1980's 28.2 per cent in terms of production value.

Business Scale of 11 Leading Japanese Semiconductor Manufacturers

(In billions of yen)

	Capital spending		Production value	
	FY1980	FY1981	FY1980	FY1981
NEC (10)	[illegible]	[illegible]	[illegible]	[illegible]
Hitachi (10)	[illegible]	[illegible]	[illegible]	[illegible]
Toshiba (10)	[illegible]	[illegible]	[illegible]	[illegible]
Fujitsu (10)	[illegible]	[illegible]	[illegible]	[illegible]
Matsushita Electronics (1)	[illegible]	[illegible]	[illegible]	[illegible]
Sharp (12)	[illegible]	[illegible]	[illegible]	[illegible]
Mitsubishi (10)	[illegible]	[illegible]	[illegible]	[illegible]
Tokyo Sanyo (10)	[illegible]	[illegible]	[illegible]	[illegible]
Oki (10)	[illegible]	[illegible]	[illegible]	[illegible]
Fuji Electric (10)	[illegible]	[illegible]	[illegible]	[illegible]
Sony (10)	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]

Notes: [illegible]

Moreover, the 11 Japanese semiconductor manufacturers intend to make huge plant and equipment investments in fiscal 1981, amounting to ¥195 billion in total, up 15 per cent, on a construction basis. They are trying to cope with the coming of the VLSI age by installing new machines, building new plants, or expanding existing facilities.

NEC plans to invest some ¥26 billion, up 18.2 per cent from fiscal 1980's ¥22 billion. It is followed by Hitachi, Ltd. (¥25 billion, up 21.7 per cent) and Fujitsu Limited (¥27 billion, the same as in the preceding year).

Noteworthy is that the production share of the Big 3 (NEC, Hitachi and Toshiba Corp.) has been declining year by year, though gradually. The share of the Big 3 stood at 39.1 per cent in fiscal 1979 but slipped to 38.8 per cent in fiscal 1980 and is expected to further come down to 34.5 per cent in fiscal 1981. This is because such medium- and low-ranked firms as Matsushita, Mitsubishi and Oki have been drastically boosting semiconductor production.

However, it should not be overlooked that the decline in the production share in the domestic market does not necessarily mirror the strength of the Big 3. NEC, Hitachi and Toshiba have been steadily building up production overseas in order to skirt trade frictions with the U.S. and European nations.

Still, however, the fact that lower-ranked firms have been stepping up capital spending on the strength of their optimistic outlook on the future trend will stimulate the semiconductor industry as a whole and help intensify marketing competition.

Fujitsu unveils 'world's biggest' computer

Fujitsu Limited has introduced what the company says is the world's fastest and largest general-purpose computer systems — FACOM M-380 and FACOM M-382.

With Fujitsu's announcement, very large-scale computers have become available from four leading computer builders — Nippon Electric Co. (NEC), International Business Machines Corp., Hitachi, Ltd. and Fujitsu.

Since NEC's introduction of its ACOS-1000 system in last September, these computer makers have claimed that their models were the "world's fastest" at the date of announcement.

As the four companies have stood on the same line, they will vie for larger shares in the world's computer market.

According to Fujitsu, the FACOM M-380, a uniprocessor system, provides 2.1 to 2.5 times the processing capability of the FACOM M-200, Fujitsu's previous top-performance system. The M-380 allows 16 to 64 megabytes of main storage and up to 64 channels with a maximum total throughput of 96 megabytes per second. The FACOM M-382, a dual-processor system, offers 3.8 to 4.5 times the processing power of the FACOM M-200, Fujitsu said.

The FACOM M-380 and M-382 adopt new large-scale integrated circuit technology including logic chips featuring a 350 picosecond propagation delay time and 1,300-gate-per-chip and 400-gate-per-chip integrations, 4-kilobit random access memory (RAM) chips featuring a 5.5 nanosecond access time and 16K RAM chips featuring a 16 nanosecond access time, and metal oxide semiconductor (MOS) LSIs featuring a 64K-bit-per-chip integration.

The FACOM M-380 mainframe will be rented at a minimum of ¥37 million a month. The M-380 system (mainframe, input/output units, and program products) will be rented for ¥30 million a month. The rental fees will be ¥75 million and ¥90 million, respectively, for the M-382 mainframe and system.

Initial shipments are scheduled for the first half of fiscal 1982.

Comparison of Very Large-Scale Computers

	Fujitsu M-380	Hitachi M-280	NEC ACOS 1000	IBM 3081
Processing speed (relative)	[illegible]	[illegible]	—	[illegible]
Maximum storage capacity	[illegible]	[illegible]	[illegible]	[illegible]
Power consumption	[illegible]	[illegible]	—	[illegible]
Maximum integration of logic circuits	[illegible]	[illegible]	[illegible]	[illegible]
Efficiency of logic circuits	[illegible]	[illegible]	[illegible]	[illegible]
Memory integration	[illegible]	[illegible]	[illegible]	[illegible]

Note: [illegible]

NTT will stage lectures to inform U.S. makers on procurement steps

Nippon Telegraph & Telephone Public Corp. (NTT) will hold a five-day orientation program for a number of American telecommunications equipment manufacturers in Tokyo starting June 22.

Its program is designed to provide American firms a general guidance on telecommunications services in Japan and NTT's new procurement procedures, individual consultations and tours to various NTT facilities.

Among the scheduled participants in the program are American Telephone & Telegraph Co., General Telephone & Electronics Corp., International Telephone & Telegraph Corp. and Northern Telecom Ltd.

This will be the third time for NTT to sponsor seminars. Earlier, NTT sponsored a three-day "Japan's Seminar on Procurement Equipment" in Washington, D.C. and Los Angeles in late April. It also held a similar seminar in Tokyo on May 25-26.

Procurement guidebook

NTT has published a guidebook concerning procurement procedures for public telecommunications equipment in Japan for the convenience of firms, domestic and foreign.

The NTT Procurement Guidebook, with English translation, is available free of charge.

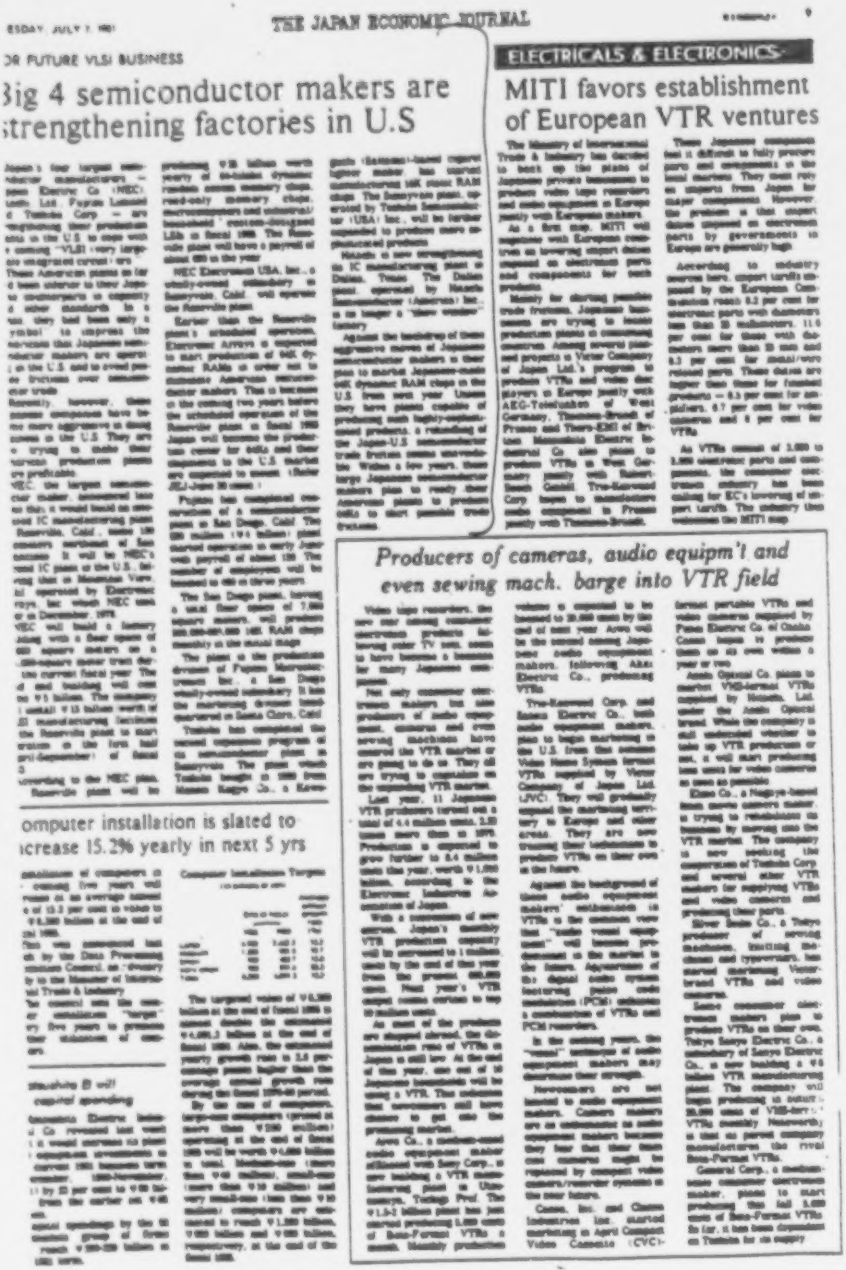
Color picture tube production increases

Production of color picture tubes last year rose 25.8 per cent from 1979 to 22 million units, topping the 20 million-unit mark for the first time.

The 1980 production accounted for 60 per cent of the world's total color picture tube output.

With rising color TV production, Japan's color picture tube output is estimated to reach 25 million units this year.

Toshiba Corp. and Hitachi, Ltd. are the top makers, with their output in 1980 reaching more than 6 million units, each. Matsushita Electronics Corp. follows them with 5.5 million units. Mitsubishi Electric Corp., Nippon Electric Co. and Sony Corp. come next. Among them, Toshiba, Hitachi, Matsushita and Mitsubishi supply a part of their products to Sanyo Electric Co., Sharp Corp., Victor Company of Japan Ltd. and other color TV makers in Japan and abroad.



THE JAPAN ECONOMIC JOURNAL

ELECTRICALS & ELECTRONICS

OR FUTURE VLSI BUSINESS

Big 4 semiconductor makers are strengthening factories in U.S

MITI favors establishment of European VTR ventures

Producers of cameras, audio equipm't and even sewing mach. barge into VTR field

omputer installation is slated to icrease 15.2% yearly in next 5 yrs

Computer Installation Targets

atsushita El will capital spending

[Excerpts from NIHON KOGYO SHIMBUN, August 5, 1981]

In order to promote the research and development of high efficiency new-type semiconductors which are considered essential in securing avant-garde technology for space development and for the development of ultra small-size computers, the Research and Development Association for New Function Elements, a foundation having the status of juridical person, was organized on the 4th (of August) under the chairmanship of Sadakazu Shindo of Mitubishi Electric.

Participating in this new organization are Hitachi, Toshiba, Mitsubishi, Fujitsu, Nippon Electric, Oki Electric, Matsushita, Sanyo, Sharp, and Sumitomo, a total of ten companies. The purpose of this new association is to develop three kinds of new high efficiency semi-conductors: (1) the element capable of computing with ultra high speed; (2) the three-dimensional circuit element; and (3) environment-resistant element.

The Ministry of International Trade and Industry, which is determined to foster the infrastructure technology for future generation industries as a precondition for "the technological nation-building in the 1990's, reportedly opted for this line of organizing research associations in the form of foundation in order to deflect the criticism for overseas, saying "Japan fosters high technology industries under the government-private cooperation."

[Excerpts from NIKKEI SANGYO SHIMBUN, August 5, 1981]

MITI's Industrial Technology Agency is said to have expressed its desire to earmark a total of 100 billion yen or more for the next ten years beginning in 1981 for the research and development of the infrastructure technology for future-generation industries. For the development of new function elements (ultra-? element, three-dimensional circuit element, and environment-resistant enforced element) alone, it is planning to set aside a research budget of about 25 billion yen as a national project. MITI has decided to solicit applicants for the project who will carry out the research and development of the new function elements.

[Excerpts from NIKKAN KOGYO SHIMBUN, August 6, 1981]

The Ministry of International Trade and Industry's Agency for a high speed computer system as a part of the 1981 large-scale project. The plan will become finalized at the Industrial Technology Deliberation Committee and the Large-scale Industrial Technology Committee which are scheduled to meet on the 21st.

As in the case of the research and development of pattern information processing system, a research and development cooperative composed of Fujitsu, Hitachi, Nippon Electric, Mitsubishi, Toshiba, and Oki will be set up to undertake the research and development under the form of a trust. In addition, (MITI's) Industrial Technology Agency and Electronics Research Center will participate as representatives of the government.

This development plan, which will encompass a period of about 8 years and an expenditure of about 30 billion yen, aims at the development of an ultra-high-speed computer which is capable of computing one billion cycles per second, about 1000 times faster than the all-purpose computer currently in use. The core of this development project is the practical application of Josephson joint element, which will exert a great impact on the evolution from the Silicon group elements to a high-speed new element. A full-scale development plan for new elements and new architecture geared to the 1990's is thus under way with the establishment of the Basic Technology Development System for the Future Generation Industries.

[Excerpts from NIKKEI SANGYO SHIMBUN, August 6, 1981]

A national project for "the research and development of new function elements," which aims at the practicalization of next generation semiconductor elements far exceeding the function of the currently commercialized silicon semiconductor, is soon to start. In as much as the project is trying to realize the level of efficiency which cannot be realized even by the currently most advanced Ultra-LSI, it plans to spend a total amount of 25 billion yen in the next 8 to 10 years.

Unlike the case of ultra high-efficiency computer or VLSI development project of the past where there were some technological "textbooks" available in overseas, this project is to explore a totally uncharted area of technology. For this reason, the Ministry of Internation Trade and Industry has decided to introduce "research foundation methods" which is unprecedented, thereby consolidating the efforts of the government and private industries on a long-range basis to push the research and development project.

Any organization wishing to participate in the research and development of new function elements can apply beginning on the 5th (of August), and one day prior to it (the 4th of August). "The Research and Development Association for New Function Elements," a foundation having the status of juridical person, was established. This association was entrusted by MITI's Industrial Technology Agency to carry out the research and development project....

The current members of the Association are composed of Hitachi, Toshiba, Mitsubishi, Fujitsu, Nippon Electric (6 computer companies), Matsushita, Sanyo, Sharp (3 electric appliance companies of the Kansai region), and Sumitomo (which is strong in optical communication) -- a total of ten companies. However, any organization can join it as a new member...

The Association will begin, as a government-entrusted project, the research and development of three subjects: ultra-(?) element, three-dimensional circuit element, and environmental resistant enforced element...

Resources satellite data center will be formed by big companies

A resources satellite
servation data analysis
nter will be created in
kyo during this month by
pan's major electric-elec-
onic machinery and ap-
iance companies and more
an 10 industrial companies
ncerned with natural
sources.
The non-profit foundation
ll be formed under the
onsorship of Nippon Elec-
ic Co., Toshiba Corp. and
itsubishi Electric Corp. to
atch governmental project
orbit Japan's first
sources satellite by fiscal
86 to hunt for possible oil
nd mineral resources in
nd round Japan.
The Ministry of Inter-
ational Trade & Industry is
lanning to launch the
atellite at a total budgetary
xpenditure of ¥100 billion.
America's Landsat series

of three such satellites already have proved so effective as to pinpoint such hitherto unknown natural resources as an oil pool under Saginaw Bay, Michigan, a natural gas field in Si Chuan Province, China, and a copper deposit in Baluchistan, Pakistan.

The center, to be established with an initial industrially-collected fund of ¥20 million with MITI's full-scale support, will take charge of development of all sorts of software concerning such remote sensing functions, including studies of American reference data, as well as processing and analyzing of all data to be telemetered down by the Japanese satellites. The sponsoring three companies will be responsible for their production.

ov't lab will study uses of ermophilic type bacteria

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c, that is, heat-loving,
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ba, Ibaraki Pref. says
microorganisms, includ-
bacteria and viruses, grow
expand best under tem-
tures of 30 degrees C or
But thermophilic bacteria,
which nearly 20 varieties
so far been discovered,
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r better temperatures of
een 60 and 70 degrees C.
me of them can live and
erate even in environs as
as 90 degrees C. Such

bacteria may be widely found where it is seething hot and humid, including hot-spring water. Researches on such bacteria's characters are already well advanced in many Japanese institutions, including the University of Tokyo and Mitsubishi Kasei Institute of Life Sciences.

But the research institute has its own aim of isolating such bacteria from their natural habitats and artificially cultivate them to find out their possible industrial use.

Such bacteria, for instance, could be utilized in many areas of the fermentation industry to save much energy and labor.

Every fermentation process using microorganisms generates high heat and requires lowering the heat to around 30 degrees C. at the cost of much energy and labor so that the microorganisms may not killed by the heat. Thermophilic bacteria needs no such cooling. Besides, invasion of other microorganisms deterring fermentation, another problem of the fermentation industry, will be automatically curbed by the use of such thermophilic bacteria because under the great heat of fermentation no microorganism other than the thermophilic varieties can survive.

Thermophilic bacteria are also potentially the best fit for genetical engineering researches, and therefore, for industrial gene recombination and other gene processing purposes under Japan's existing official guidelines to ensure the safety of all such researches. Under the guidelines, all artificially created kinds of microorganisms should be of such characters as being unable to grow and propagate in normal natural environments.

Some thermophilic bacteria can live only in hot-spring water and other special hot environs and die when the temperature goes down to below 40 degrees C., they could be considered unlikely to grow in a normal natural environment.

tellite for eather use launched

e National Space Develop-
t Agency succeeded last
day in placing a 280-kilo-
n meteorological satellite
a drift orbit.
e satellite, christened
awari (Sunflower) II, will
radually moved to a per-
ent geostationary orbit
New Guinea at a point 140
Longitude over a space of
nth.
will replace the present
awari satellite and start
ding pictures of cloud
ations around Japan from
December.
SDA launched a three-stage
rocket early Tuesday
ning at its space center on
egashima Island, Kago-
a Pref. The rocket placed
satellite, measuring 2.15
ers in diameter and 3.45
ers in length, into its sched-
orbit. This is the first time
Japan has launched a
stationary meteorological
lite (GMS) for practical
on its own. The present
awari satellite was sent up
the help of U.S.

SCIENCE & TECHNOLOGY

Circuit lines of 0.5 micron width are etched on wafer by new tech.

A new ultra-microscopic semiconductor circuit printing method of ionization and chemical reaction type for etching circuit lines of no more than 0.5 microns in width on a few millimeter-square silicon chip has been experimentally developed by a laboratory of Nippon Telegraph and Telephone Public Corp. (NTT).

According to NTT's Musashino Electrical Communication Laboratory, the most densely integrated version of integrated circuit semiconductors so far commercialized, that is, the First Generation of very large-scale integrated circuits (VLSI), is the 64-kilobit RAM (random access memory) type of VLSI circuits, with about 150,000 electronic elements printed on such a tiny chip.

The Second Generation, already developed at laboratory level, is the 256-kilobit RAM type with some 600,000 electronic elements similarly printed.

While the First Generation circuits require a precision printing (etching) process going down to 2 or 3 microns in circuit line width, the Second Generation needs a more sophisticated process reaching down to 0.5 microns in that width.

But NTT's laboratory, engaged in developing such technology since 1975 together with Nippon Electric Co. (NEC), Hitachi, Ltd., and Fujitsu Limited, already has finished developing the Second Generation circuit printing process by March, this year, and has since been studying how to print Third Generation, or a 1 mega-bit RAM type, capable of packing no less than 2.4 million elements on such a midget chip.

The new method is a decided departure from the past optical or electron beam method. It is tentatively known as the Electrocyclotron Resonance (ECR) process to do every such extremely complex and dense etching job at a stroke by the impact of ionization of chemical substances and the chemical reaction in the resulting plasma.

NTT's new achievement, when refined, means completion of Japan's technology of basically etching the next generation VLSI circuitry along with a new high-precision electron beam exposure photo-mask producing and an X-ray exposure circuit transprinting method (from the original pattern to wafer) jointly developed with the cooperating companies on the basis of such exposure devices developed together with Hitachi and Nippon Kogaku K.K.

TH

Toray makes zirconia ceramic having high bending strength

A new engineering ceramic, having the world's highest bending strength of all such modern industrial ceramics at room temperature, has been commercially developed by Toray Industries, Inc. of Tokyo. The ceramic is a sort of sinter of zirconia (zirconium oxide) with a 3 per cent yittria (yittrium oxide) addition.

According to the first-rated Japanese synthetic fiber maker with many chemical sidelines, its new engineering ceramic—"fine ceramic" or "new ceramic" in Japan's technological terminology—could be widely applied to tools, machine parts and cutting edges requiring such high bending strength or toughness, including wire-drawing dices.

The Government's Mechanical Engineering Laboratory, cooperating to find such uses, is already trying out the new product in making surgical and cooking knives. The new product is believed unfit for use under extremely high temperatures zirconia itself may withstand, but its sinter cannot, in contrast to other kinds of new ceramic like silicon nitride or silicon carbide.

How to bake the new product's materials, a powdered form of the salt remaining after smelting zirconium-containing ore, and yittria under a high pressure is said to be the same as producing any other engineering ceramic, the company explained.

But the new product, as so far tested, proved to have maximum strength to withstanding between 150 and 170 kilograms of weight per square millimeter, compared with 130, hitherto the world's highest, for a silicon nitride equivalent.

In toughness (as expressed by "Young's modulus"), it has surpassed all sorts of fine ceramics so far known to have been developed. Such modern ceramic have had the common drawback of brittleness.

Research on laser resistant optical film

The Government-affiliated Research Development Corporation of Japan recently announced two new projects: 1) Development of a method to produce optical film resistant to the destructive power of strong continued laser beam bombardment, and 2) Development of a method obtaining energy by gasifying plastic-containing industrial waste matter deep in a hot sand pile.

According to the corporation in Tokyo, the two methods, already developed in their basic ideas respectively by Prof. Yoichi Murayama of Toyo University in Tokyo and Prof. Taiso Kunii of the Engineering Faculty, University of Tokyo, will be polished up into really applicable processes by two domestic companies it has named to undertake the jobs as usual with all its projects of the kind. The two companies are Showa Optical Co. and Tsukishima Kikai Co., both of Tokyo.

Showa Optical is to develop the first of methods for the corporation in three years at a total cost of ¥130 million, while Tsukishima Kikai the second in two years for a total cost of ¥250 million. The governmental corporation will pay the costs.

According to the corporation, laser beams, now widely used for industrial processing, communication and medical purposes, in the case of industrial product or material processing, require many kinds of filming or plating to the surface of the lens and reflector of the processing machine. Included in such kinds are a "beam reflection preventing" type to let the beam penetrate its object well by minimizing the undesirable reflections, a beam reflection-boosting type to increase the reflections to assist the preventing type, and multiple-layer polarizing plating to separate the beam into various components.

While such filming and plating have been developed, every attempt to increase the output of the laser beams has come to demand a new kind of such filming strong and durable enough against the destructive force of such beam bombardments, especially when long continued. But the conventional vacuum deposition method of producing such filming has been limited in ensuring such strength of filming, and also in guaranteeing the good attachment of such filming with the lens or reflector surface.

The academically-devised answer to the problem consists in building a multiple-layer structure of 20 to 40 alternate piles of high-refraction materials like titanium oxide and zirconium oxide and low-refraction materials like silicon oxide. The method also involves a "high-frequency ion plating" process to heat each such material into thin filming with a high-frequency electric power coil and a special film polishing process to remove all defects on the surface of such filming.

The scholarly solution to the also difficult plastic-involving waste burning question is to mix such waste matter with heated sand in a funnel-shaped inversely conical furnace. Plastics in such wastes, including milk and other beverage-vending containers, will be heated into gas at the bottom of the furnace when the hot sands are circulated by air blowing through a lower side hole. The gas to be thus derived will have at least 2,000 kilocalories of energy per cubic meter, high enough to be used as an industrial fuel.

IBM WILL BE PARTICIPANT

Japan-U.S.-Europe project for future computers will be formed

A Japan-U.S.-Europe tripartite project to jointly develop the so-called "fifth-generation computers" will be inaugurated next year as 15 leading American and European companies already have notified their intention to participate in the Japanese Government-proposed meeting of computer experts in Tokyo scheduled for late October.

The experts meeting is expected to lay the ground for the planned 10-year international project, starting next April.

A fifth-generation computer, an advanced version of the present fourth-generation one, is a high-performance unit capable of "learning," "inference" and other functions that conventional computers cannot do.

Among the 15 participants are International Business Machines Corp., Sperry-Univac, Honeywell, NCR, Texas Instruments and Siemens. IBM's participation will give significance to the planned project as the world's largest computer builder already has made several breakthroughs in techniques to produce next-generation computers.

The Japanese Government has called for international cooperation to develop such high-performance computers as well as cooperation among the government, industry and scholars. Major reasons that has led the Japanese Government to propose the tripartite project are:

—Development costs will become too huge for a single company or a single country to meet.

—A joint tripartite project will prevent possible frictions over high technologies from developing among them.

—Basic studies on components for the fifth-generation computers have progressed to a considerable extent at governmental institutions in industrialized nations, and joint utilization of such studies will accelerate development of next-generation computers.

Other major overseas participants in the experts meeting are Honeywell-CII of France, Nixdorf of West Germany, Dearborn Canada Computer of Canada and Computer Maintenance of India.

About 50 top-rate scholars and technicians of Japan, the U.S., Britain, France and West Germany also will attend the meeting and disclose their recent achievements.

Sources close to the Japanese Ministry of International Trade & Industry highly rated IBM's participation in the meeting as it so far has been developing techniques on its own.

Optimism is unwarranted, however. There are many problems to clear before fifth-generation computers are practicalized, such as possible disputes over patents and know-how on the fruits of the joint development project.

TH

Six domestic computer makers are unable to return subsidies

Profitability of Japanese computer makers is so low that they now find it difficult to repay before the March 31, 1982 deadline the subsidies they received from the Government in the early 1970s.

Fujitsu Limited, Hitachi, Ltd., Nippon Electric Co., Toshiba Corp., Mitsubishi Electric Corp. and Oki Electric Industry Co. have received a total of ¥57,470 million worth of subsidies for five years since fiscal 1972 for development of super high-performance computers.

Since around 1974, they have developed such medium- and large-size general-purpose computers as the M Series (the Fujitsu-Hitachi group), the ACOS Series (NEC-Toshiba) and the MELCOM/COSMO Series (Mitsubishi). Oki withdrew from the general-purpose computer field.

It was learned recently that none of the six Japanese computer builders has paid back the subsidies. They are required to repay the subsidies when they earn profits from sales of computers that they have developed on the subsidized projects. No repayment indicates that they are still unprofitable. This sharply contrasts their recent remarkable achievements in computer hardware technology and Fujitsu's outranking of IBM Japan Ltd. in sales to become the nation's largest computer maker.

The low profitability of Japanese computer makers is ascribed to their excessive price-cutting marketing competition and huge research and development costs. According to a survey of the Ministry of International Trade & Industry, the computer industry spends an average of 9.3 per cent of sales for R&D, far higher than that of other industries.

It will take some more time before the Japanese computer industry becomes profitable, a MITI official said.

NTT's revenues recorded small rise in FY '80

Revenues of Nippon Telegraph & Telephone Public Corp. (NTT) in fiscal 1980 ended March 31 totaled ¥4,086 billion, up 3.9 per cent from the preceding year's ¥3,936 billion.

The rate of increase was the lowest in NTT's almost 30-year history, though the value topped the ¥4 trillion mark for the first time. The monopoly of domestic telecommunications ascribed the poor fiscal 1980 performance mainly to the saturation of the telephone subscribers.

Of the total revenues, domestic telephone services accounted for 88 per cent, telegraph 1.6 per cent and leased circuit service 6.3 per cent, NTT said.

Net income dropped 14.3 per cent to ¥288 billion from fiscal 1979's ¥403 billion. However, the fiscal 1980 net income was far larger than the ¥274 billion targeted in the initial budget.

Total expenditures, including personnel and material expenses, reached ¥3,818 billion, up 6.3 per cent over the preceding year.

Fujitsu sets up IC design center in California

Fujitsu Limited has set up a design center in Santa Clara, Calif., mainly for designing custom-made integrated circuits.

The designing system installed at the center is connected with large computers at Fujitsu's Kawasaki Works near Tokyo through satellites.

Fujitsu hopes to set up similar IC design centers throughout the U.S. to meet the need of American customers of Fujitsu semiconductors.

The design center comes under aegis of Fujitsu Microelectronics Inc., a subsidiary in Santa Clara operating a semiconductor plant in San Diego.

ELECTRICALS & ELECTRONICS

VHD format will be used by Hitachi for Japan mkt

Hitachi, Ltd. last week revealed that it would adopt the VHD (Video High-Density) formula for the video disc players it plans to introduce in the domestic market next April.

The Tokyo company already has been marketing in the U.S. video disc players based on the CED (Capacitance Electronic Disc) format originally developed by RCA Corp.

Hitachi's decision will greatly encourage the VHD group, led by Victor Company of Japan Ltd. (JVC), which earlier announced delaying marketing VHD discs and players by six months from the originally scheduled date to April (JEJ-August 25 issue). Other major VHD group firms are Matsushita Electric Industrial Co., General Electric Co. of the U.S. and Thorn-EMI Ltd. of Britain.

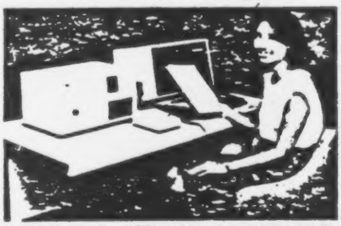
The six-month postponement, together with Pioneer Electronic Corp.'s announcement to market in Japan optical, laser pickup format players in October, has been greatly shaking Japanese companies which already have opted for the VHD formula. They have been closely watching Hitachi's action as Hitachi was one of major companies undecided about the format for players to be sold in Japan.

With Hitachi's joining the VHD group, Sony Corp. is the sole company which refrains from revealing which format it will select for marketing in Japan.

Hitachi has put away the optical format from judgment that it will become popular primarily among industrial-use players in the initial stage, at least. However, there is a possibility that Hitachi will examine the optical format again depending on the demand movement.

Hitachi has been marketing CED-format players in the U.S. since June as it feels that the stylus-in-groove electro-capacitance method will dominate the American video disc player market along with RCA's far-reaching marketing campaigns. Hitachi now turns out 10,000 CED-format players a month.

NEC sells new voice system



Nippon Electric Co. (NEC) has started marketing what the company says is the world's first voice recognition system capable of converting simple sounds uttered by a person into a written form. The system, code-named SR-300, recognizes 68 different Japanese syllabic sounds, 10 numerals and about 30 different words, while conventional systems up to now could recognize only a limited number of pre-memorized words. Listening to the speaker's pronunciation of simple sounds, the system, if connected with a word processor, makes sentences on the display, NEC says. The recognition rate is as high as 95 per cent for simple sounds. It sells for ¥3,180,000.

Toshiba to sell electrocardiograph

Toshiba Corp., the nation's largest medical electronics equipment maker, will shortly start marketing electrocardiographs supplied by Nihon Kohden Kogyo Co. under the Toshiba brand.

Electrocardiographs will be the first product to be sold under the three-year business arrangement that the two medical electronics maker concluded late July.

Toshiba is expected to sell 50 to 100 three-channel type, semi-automatic electrocardiographs in the initial year. When it clears inventories of single-channel models, possibly early next year, Toshiba will rely on Nihon Kohden for its supply.

Toshiba is the top maker of X-ray computer tomographic scanners, ultrasound diagnostic equipment and other "imaging" medical electronics. It has teamed up with Nihon Kohden to complement its weakness in the fields of electrocardiographs, electroencephalographs and other medical measuring instruments in which Nihon Kohden is the largest supplier.

Grundig will introduce CVC format

Grundig, a leading West German household electric appliance maker, will introduce the Compact Video Cassette (CVC) format for its planned portable video tape recorders, industry sources here revealed last week.

The CVC format, originally developed by F.T. Giken K.K. of Yokohama, features use of a 1/4-inch video tape, instead of a 1/2-inch one used for the VHS (Video Home System) and Beta-Format VTRs.

The West German firm has been marketing Grundig/Philips format VTRs mainly in the European market. But the share of the European format in the home market reaches as low as 10 per cent as to take a beating from the Japanese VHS and Beta-Format. Grundig reportedly plans to make a roll-back attempt against its Japanese rivals by introducing portable VTRs based on the CVC formula.

In Japan, Funai Electric Trading Co. of Osaka has been marketing CVC format portable VTRs and recently Canon Inc., a leading camera maker, started selling them on an original equipment manufacturer (OEM) basis. Their market share is still negligible, however.

Grundig's adoption of the CVC format is expected to stimulate other companies to follow suit. Philips of the Netherlands reportedly is also interested in the CVC format. If the Dutch company introduces it, the CVC format will become a promising formula for portable VTRs.

According to the sources, Funai and F.T. Giken will supply 4,000 to 5,000 units a month to Grundig in the initial stage for marketing under the Grundig brand.

Industrymen feel that European companies' preference to the CVC format will have a delicate influence on negotiations on standardization of ultra-compact, single-unit video camera/recorder units.

Keidanren considers setting up own biotechnology safety rules

The Japanese industry's own code for ensuring the safety of all biotechnological ventures, such as gene recombination, will be drafted in fiscal 1981 by the Committee on Life Science of the Federation of Economic Organizations (Keidanren).

Biotechnology, while being one of the most promising areas for innovational developments, also poses a wide public fear or uneasiness as to safety, and even ethical or moral problems because it could give rise to artificially-created unknown living things dangerous to life or health or destructive to nature and environment.

The Government has set at least a basic guideline to minimize such risks, and its Science and Technology Agency plans to build a gene recombination experiment facility at the Tsukuba academic area, near Tokyo.

The Government's guideline, based on the recommendation of its Council for Science and Technology, has established an overall framework, including obligations of every gene engineering institution to prepare a specially safeguarded experimental facility and every such institution or industrial enterprise to create a responsible safety committee.

The Keidanren committee is to supplement this national guideline more practically so that all would-be gene engineering enterprises could easily plan their ventures.

The committee is now trying to define the coverage of the code, especially to decide whether to include cell fusion and massive microorganism culture attempts.

Redeveloped into a permanent committee last May from the defunct council on life science of Keidanren, the committee includes in its membership representatives of 70 principal Japanese chemical, food and other industrial enterprises interested in biotechnology. One of its two subcommittees, the Recombinant DNA Technology Study Subcommittee, is to work out the basic plan for the code.

IITI will extend priority to omestic firms in patent cases

The Ministry of International ade & Industry, building sic technology today for morrow's computers and tical communication devices, is reportedly decided to grant iority rights to domestic iterprises for licensing itented or patent-pending eas for joint development by e Government and domestic dustry of integrated circuits, was recently learned.

According to sources close to ITI, the decision was motivated by MITI's consideration at although the past project nder its sponsorship between 976 and 1980 proved success, a llow-up seven-year project it to launch this fall would discourage industrial participaon under the planned system.

IITI is especially worried over ossibilities of the Japanese emiconductor industry losing s present technological competitiveness with American or vest European industry because all existing or prospective patent rights for the new Cs belong to the Government s national property. Worse till, such nationally-owned atent rights would have to be nternationally licensed according to a recent Tokyo-Washington agreement resulting from a demand of International Business Machines Corp. and other U.S. semiconductor makers.

Under the circumstances, many Japanese semiconductor makers have been calling for some liberalization in this patent right ownership system. MITI thus has concluded that although the basic principle of ensuring national ownerships of patented ideas resulting from a chiefly government-financed projects should be kept intact, industrial enthusiasm for continuing the joint project will have been retained by the incentive of giving the patent licenses to the domestic participants in the project ahead of all other license seekers.

According to the sources, MITI has also decided to be more selective in choosing industrial participants in the project, weeding out every technological laggard, American style.

MITI's new project divides into two categories — 1) To develop a three-dimensional electronic circuit element for wonder computers of the future. Each element of a 7-mm cube will contain several million transistors and a palm-sized assembly of elements will be just as capable as today's medium-sized computer set, and 2) To develop and optically-operable type of ICs (opto-electronics ICs) to be widely applicable to industrial robots, automobiles as well as computers.

Venture to make amorphous metal alloys is slated

A joint Japanese-American industrial venture to produce various amorphous metal alloys is expected to be inaugurated in Tokyo shortly.

A group of four major Japanese industrial corporations of the Mitsui financial-industrial combine announced the scheduled start of the new enterprise under equal investments with Allied Corp. of Morristown, New Jersey.

The quartet are Mitsui Petrochemical Industries, Ltd., Toshiba Corp., Mitsui Engineering & Shipbuilding Co., and Japan Steel Works, Ltd.

According to the group's announcement, the prospective enterprise, tentatively called Nippon Amorphous Metal Co., Ltd., to be set up in Tokyo at a starting paid-up capital of ¥300 million, will initially import and sell Allied's amorphous metal alloys before starting its own local production in a few years.

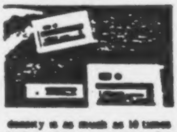
To be headed by K. Izumi, retiring managing director of Mitsui Petrochemical Ind., the new company will sign a technological licensing contract with Allied Corp. to import the latter's iron-based amorphous alloy producing processes.

The uncrystallized metal alloys produced from hot molten forms of various metals by rapid refrigeration have many decided advantages over the conventional crystallized metal or metal alloys.

As represented by Allied Corp.'s products, they are far more sensitive in reaction to magnetism, much stronger in electric resistance but much less susceptible to structural changes due to temperature fluctuations. They are also much higher in mechanical strength and resistance to corrosion. Also producible at lower costs, they could supersede conventional alloys in making engine welding materials, electric coil cores, power transformer cores, and many other products.

Thin sheet type of lithium battery

Matsushita Battery Industrial Co., a battery manufacturing subsidiary of Matsushita Electric Industrial Co., has developed what the company says is the world's first paper-thin sheet-type lithium battery.



The innovative battery measures only 1.3 millimeters thick, yet features high energy density.

The new paper-thin lithium battery uses lithium in its negative electrode and carbon monofluoride as the positive electrode.

Nominal voltage stands at 3 volts, double the voltage of ordinary batteries. Energy density is as much as 10 times higher than manganese dry batteries.

As it works well even at low temperatures, the battery is well suited for application to electronic watches, liquid crystal display calculators and professional communications equipment.

SCIENCE & TECHNOLOGY

Synthetic secretin is made by recombination of genes

— Wakunaga Pharm. succeeds —

Japan's first industrial success in utilizing gene recombination for synthesizing a biological drug has been attained by Wakunaga Pharmaceutical Co.

The Osaka company also said it has developed its own method of mass-producing interferon by the gene recombination technology.

According to the drug company, it used gene recombination technology to synthesize a hormone known as secretin.

This hormone, in its natural form, has been in an extremely short supply. Secreted by the human and animal digestive tracts and the pancreas of hogs, secretin is a highly effective cure for duodenal ulcer and other digestive troubles, and also a good diagnostic drug to check secretions of the pancreas. Human secretin, however, has been too scarce in availability and the hog-produced substitute has so far been pharmaceutically processed and supplied. But even such supplies have been often hard to come by because all that can be derived from the pancreas of every 10,000 hogs reaches no more than 20 milligrams.

Observers attached much significance to the company's achievements as a testimony to Japan's attainment of the world's top level in genetical engineering technology rather than as a breakthrough in mass production of the hormone drugs or as a new way of mass-producing interferon.

According to the company, its achievements have been based on researches of new Japanese gene engineering experts who had studied under Dr. Keiichi Itakura, an internationally known Japanese genetical scholar now in the service of the City of Hope Medical Center in the U.S.

The secretin synthesizing method adopted by the company enables producing a variety of natural secretin, called 27-desamidosecretin that has 27 amino acid units, the same as the natural one, but slightly different for the non-amide character of its amino-acid structure terminals.

Each amino-acid structure of the hog secretin has been split up into 16 parts and each part synthesized into a new kind of gene by the use of a special kind of enzyme known as DNA ligase. Each such gene was implanted into a plasmid (an extra-cell nucleus gene or a vector to carry external information into the intra-cell nucleus gene) and thus into the intra-cell gene of the bacillus E. coli, a common kind of intestinal bacteria.

Out of many such a processed bacteria, those indicating correct insertion of the synthetic genes have been picked and cultured. These bacteria thus have produced the 27-desamidosecretin in abundance.

The company said some more study will be necessary to make sure if the slight difference in terminal chemical radicals of the synthesized secretin from the natural one might cause undesirable by-effects.

As far as interferon is concerned, Wakunaga is the first Japanese company synthesizing the wonder drug on its own method, though Genentech, Genex and some other foreign companies have succeeded.

Observers expected the company's two successes to prompt many other would-be genetical engineering Japanese industrial enterprises to review their research systems or seek American or other Western technological cooperation to speed up their follow-up achievements.

Hitachi forms data retrieval system for patents of the world

Hitachi, Ltd., has completed and put into operation a comprehensive patent information retrieval system, covering information from advanced nations including Japan itself, for utilization by all of its domestic factories and research institutes.

Its system is called HITOPICS — Hitachi Totalized Patent Information and Control System.

Without precedent in Japan, it has resulted from its past efforts to keep itself informed of all the world's patent affairs, especially through on-line computerized information links it has built.

They include the Japan Patent Information Center (JAPATIC) under a 1979 service contract covering the latter's entire Japan-U.S. exchange patent reports; System Development Corp. (SDC) of the U.S. under a 1980 service contract covering the latter's all patent reports gathered from 34 countries, and Lockheed Missile & Space Co. of the U.S. under a last April contract covering the latter's all-American patent report.

Constituting the heart of the new system are 30,000 items of patented or patent pending ideas of Hitachi itself stored up in a large computer at its Hitachi Research Laboratory at Hitachi, which is the center of the system.

The company so far has terminal sets of the system among its 27 factories and eight research institutes in Japan. It plans to increase the sets to 300 for complete covering in the next two years. All sought informations are instantly provided in color on picture tube screens or printed out at terminals.

ıpan & U.S. concur on lowering ͻ tariff earlier than scheduled

ɔan and the U.S. agreed week to lower tariffs on rts of integrated circuits er than the previously ed schedule. The agreement was reached at the Ja- U.S. subcabinet-level discussions held in Washington on ember 14-15.

e accord calls for Japan's ring import duties on ICs 2 per cent, effective next 1, from the present 10.1 per. The U.S., on its part, will such tariffs in two steps — 24 per cent next January further to 4.2 per cent in ary, 1983 from the present er cent.

and after January, 1983, ort duties on ICs in Japan the U.S. will be harmonized 2 per cent. The harmonization date is four years earlier n the scheduled date agreed the Tokyo Round of multi- eral trade negotiations. The yo Round agreement calls lowering of IC import tariffs .2 per cent by 1987.

apan has been taking the iative in negotiations for the tariff reductions. Japanese ime Minister Zenko Suzuki ormed U.S. President nald Reagan of Japan's adiness to cut IC tariffs in ir talks in Washington early ay. The U.S. accepted the offer, and working-level discussions on details had been under y between the two nations.

The Japanese initiative apparently stemmed from the panese Government's aim to eviate mounting American criticism against the alleged "closed character" of the Japanese market.

IC trade between Japan and the U.S. turned in Japan's favor (¥2.8 billion) last year from the ¥22.3 billion deficit in 1979. It was feared that the imbalance in the IC trade might rekindle smoldering bilateral trade frictions if it was left to develop into a critical stage.

In this sense, a government official highly evaluated the latest agreement on IC tariff reductions, saying that it would be a good example for avoiding possible bilateral trade frictions over computers and other high-technology products in the future.

Life insur. firms buy more foreign bonds and stocks

All of the life insurance companies lately have greatly stepped up their investment in foreign bonds and overseas stocks, according to informants.

They said these firms have increased their acquisition of foreign bonds, centering on U.S. dollar-denominated bonds.

The investment of the five largest insurance companies during the period from April to August, this year was said to have aggregated slightly less than ¥180 billion in value, or eight times as much as the same time of last year.

In the back of such investment are such as the following reasons:

—The dollar has been in a rising phase since April.

—The American bond market has recorded a sharp drop, and this has sent up bond yield.

The outstanding balance of investment of the five insurance firms at the end of August thus is said to have grown about 20 per cent from that at the end of March.

Signs are that the life insurance companies will further step up their buying of overseas negotiable securities in closely watching the trend of high interest rates and foreign exchange quotations.

The life insurance companies started investing in foreign negotiable securities in earnest after sporadic buying up to then, from around fiscal 1978.

The outstanding balance of such investment by all of the domestic life insurance companies at the end of fiscal 1980 attained about ¥1,200 billion, roughly 30 per cent of their total assets. The five largest life insurance firms accounted for approximately 60 per cent of the amount.

According to the informants, in the April-June quarter of the current fiscal year, investment in dollar-denominated bonds by the life insurance concerns ran to about 30 per cent of the total bond investment, and that for Canadian dollar-based bonds, about 37 per cent.

As to stocks, investment in dollar-denominated stocks comprised about 70 per cent of the total. It was believed that the share of dollar-based investment would grow as the yen rate was down in July and August.

ʀatio of R&D to sales —

(Continued from Page 1)

ready derives two-thirds of s profit from fields other than ynthetics, and its accumulation of various technologies is hanging the composition of its earnings. All of the textile makers also are expanding heir R&D outlays in non-textile reas.

As to chemicals, many companies are putting weight on esearch in biotechnology which, as Masaki Yoshida, resident of Mitsubishi Petrochemical Co., says "has an extremely high growth potential."

Meantime, the survey found this time that many enterprises were increasing their R&D spending despite their sluggish business trends at this moment.

Sample case was Mitsubishi Chemical Industries, Ltd., which in fiscal 1981 (term ending January, 1982) is spending ¥16 billion for R&D, 7 per cent more than for the preceding year. In absolute terms, this is the biggest outlay for a company in this field. However, in its business year ending January, its pre-tax recurring profits appears due to drop to ¥5.1 billion or less than one-third of the ¥17.8 billion of the preceding year. This shows that the company considers R&D spending an inevitable weapon for it to win out in competition.

Many thus feel that corporate research and development expenditure is destined to keep swelling despite slow business and dull global economic growth.

(R&D expenses covered by this survey are defined as expenses specifically needed for development of new products and technology, in production, marketing and administrative costs, as well as the portion amortized during the current accounting period out of expenses recorded as deferred assets on book. They include manpower cost. Another R&D survey by Nihon Keizai Shimbun reported on the Japan Economic Journal March 31, 1981 issue is based on increases in tangible fixed assets. The difference in the basis of the two surveys explains sharp discrepancies in figures.)

R&D Expenses in FY1980

[illegible]

		[illegible]
1	[illegible]	[illegible]
2	[illegible]	[illegible]
3	[illegible]	[illegible]
4	[illegible]	[illegible]
5	[illegible]	[illegible]
6	[illegible]	[illegible]
7	[illegible]	[illegible]
8	[illegible]	[illegible]
9	[illegible]	[illegible]
10	[illegible]	[illegible]
11	[illegible]	[illegible]
12	[illegible]	[illegible]
13	[illegible]	[illegible]
14	[illegible]	[illegible]
15	[illegible]	[illegible]
16	[illegible]	[illegible]
17	[illegible]	[illegible]
18	[illegible]	[illegible]
19	[illegible]	[illegible]
20	[illegible]	[illegible]

Official crude oil stock will be raised to 11 million kls

The volume of crude oil stocked by the Government in the current fiscal year is going to be 3,500,000 kiloliters.

The Government already has purchased as early as in August 1,000,000 kiloliters for stocking from private companies.

It hopes to buy the remaining 2,400,000 kiloliters in two installments in October and November.

The volume of crude held in reserve by the Government at the end of the current fiscal year, next March-end, will aggregate 11 million kiloliters, in combining the amount held in stock up to fiscal 1980. This constitutes a 16.7-day supply. It means that additional stocking of 1,000,000 kiloliters has become possible within the scope of the original national budget.

TH

IBJ and other banks offer loans for Carajas project

The Industrial Bank of Japan has intimated to Brazil that it and other Japanese banks are prepared to offer cooperative financing amounting to $250 million to that country's gigantic Carajas iron ore development project, it was learned here last week.

The Carajas project — one of the world's largest of its kind — is estimated to entail a cost of $5 billion, equivalent to ¥1,100 billion. The Brazilian Government has requested Japan to contribute financing amounting to $500 million to it.

IBJ is said to have presented a plan to Brazil to offer dollar-based joint financing amounting to half of the country's request, namely $250 million, equivalent to slightly less than ¥600 billion.

Since various Western nations which also have received requests for financing help from Brazil still have not made responses, IBJ's proposal constitutes the first case of suggested cooperative financing for the Carajas project.

Indications point that IBJ will become the focal point in loan negotiations with Brazil and that this bank actually will assume the leadership in arranging the financing.

The Industrial Bank of Japan is said to have submitted a concrete plan as to how it could cooperate in offering financing to the Carajas project when a high Brazilian official came to Japan early this month to explain in detail the country's fund needs for the project.

The gist of the IBJ plan is that the Japanese Government and private financial organs, centering on IBJ, will offer financing amounting to $250 million.

As for the financing by private quarters, it suggested that a sum of $125 million would be in the form of a dollar-based syndicate loan by Japanese banks, and the remaining $125 million would be procured by yen-based private bond subscription.

Brazil further is said to have been told that financing by the Export-Import Bank of Japan could be counted upon with regard to the portion of government financing.

The Brazilian side, in principle, wishes "low interest financing by the government," or an interest rate of about 8 per cent per annum from Exim Bank.

As to this, the Japanese Government has taken a cautious position, as in the cases of other foreign nations from the standpoint that the "profitability of the Carajas project is not clear."

IBJ thus feels that the chances of the Japanese Government fully meeting Brazil's request for extending $500 million in finance are very slim. It is from this standpoint that it proposed cooperation from a private stand.

Direct foreign investments —

(Continued from Page 1)

ary receipts and convertible bonds denominated in pound sterling, and other funds it procures domestically.

In addition to this, Nissan is now actively propelling plans to build up its engine plant in Mexico and for its joint venture with Alfa Romeo in Italy. As to this, it remarks that it is going actively to remit money to its overseas subsidiaries for capital increases or for lending.

As for the yen rate, it has been following a declining trend since the start of this year. Ordinarily, if a cheap yen situation prevails, it requires more yen to make a direct investment overseas, and this leads to discouraging such investment.

The reason that investments are increasing is that the cost of procuring money overseas now is relatively more expensive aside from the considering the loss from the foreign exchange quotation. In other words, the widening interest rate differential between Japan and the U.S. is the essential reason.

Direct investment overseas by Japanese companies break down into two types:

—Those for setting up subsidiaries overseas or increasing their capitalization.

—Those for supplying the subsidiaries with plant and equipment buildup funds or operating funds.

According to the Ministry of Finance, direct investment overseas in the January-June period of this year reached about $2.4 billion, with remittances for capital increase and for lendings being about equal at $1.2 billion.

This is double that for the same time of last year when capital increases and lendings each ran to about $600 million for a total of about $1.2 billion. Indications also are that the investment amount is going to surpass this fall the all-time performance of about $2.9 billion set in 1979.

But the increase in direct overseas investment is not ascribable solely to the interest differential, but basically to the investment zeal of the Japanese enterprises themselves.

This is reflected in the active investment stance lately of life insurance firms which so far had not been very enthusiastic.

For instance, Dai-ichi Mutual Life Insurance Co. has teamed up with construction company Kajima Corp. to undertake city redevelopment in Minneapolis of the U.S. and has remitted about $3,300,000 to the local subsidiary there it set up last May.

Direct investment overseas by traders also is brisk. Sumitomo Corp. is pushing plans to set up a grain elevator in the U.S. with an American grain company for undertaking intermediary trade in grain with China and Southeast Asia.

Building of the grain elevator is to start in November, this year for completion in 1983.

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Inayama urges fresh approach to appease EC grievances

The Japanese business delegation, led by Yoshihiro Inayama, president of Keidanren (Federation of Economic Organizations), last week expressed the view that Japan had to take a fresh approach in complying with European trade criticisms on the completion of its round of visits to European countries.

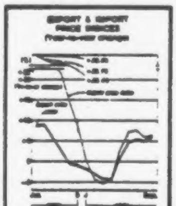
The mission's feeling was contained in an overall "interim" report made to Japanese Prime Minister Zenko Suzuki, which was made public in Rome to newsmen.

The influential Japanese business leaders' group, sent out by the Government, encountered a relentless shower of caustic trade criticisms during its trip, particularly from Britain and France.

As to this, the interim report informed the Prime Minister that if Japan failed to take a fresh approach in Japan-Europe cooperation, this was likely to arouse trade protectionism in Europe, and lead to collapse thereby of the principle of free trade.

It outlined at the outset the present situation in Europe and stressed the following points made by the Europeans: 1) The European countries now are confronted with serious economic difficulties; 2) The swift increase in Japanese exports, such as cars and home appliances, are creating political and social problems; 3) The European nations will be unable to avoid trade protection-

(Continued on Page 6)



The export price index (1975 = 100) in September rose 5.8 per cent from a year before to 108.5, the Bank of Japan reported Tuesday. The import price index (1975 = 100) also increased 6.4 per cent to 163.7, according to BOJ. On a month-to-month basis, the export and import price indices declined 0.7 per cent and 1.2 per cent, respectively, helped by the yen's appreciation. The indices are based on f.o.b. and c.i.f. prices in yen.

FOR FIRST TIME IN THE WORLD

NEC will mass produce 256-kilobit RAM chips

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By TAKAHIDE NONAKA
Nihon Keizai Shimbun Correspondent

Nippon Electric Co., the nation's largest semiconductor maker, will mass produce 256-kilobit random access memory chips, possibly in 1983.

It will become the world's first commercial producer of 256K RAM chips as no company in the world has yet established their mass production technique. The 256K denotes the number of memory cells in each tiny chip, theoretically 256,000. The memory capacity is four times as large as the preceding 64K.

NEC revealed last week that it will build a plant for manufacture of very large-scale integrated circuits (VLSIs) at a cost of ¥27 billion in Sagamihara, Kanagawa Pref., near Tokyo, and install highly sophisticated facilities and equipment to mass produce 256K as well as 64K RAM chips. Construction will start late this month.

The two-year project calls for building a three-storied plant having a total floor space of 19,000 square meters. The project will comprise two phases. In the first phase involving plant and equipment investments of ¥15 billion, NEC will complete production lines for 64Ks by September, 1982. Installation of 256K production lines will be carried out in the second phase. Mass production of 256Ks thus will be initiated sometime during fiscal 1983 (April, 1983-March, 1984).

The new VLSI manufacturing plant will use 5-inch silicon wafers to produce such superchips. The monthly wafer input volume during fiscal 1983 is planned at 60,000 units, meaning that the plant will be capable of producing 1 million VLSI chips a month in terms of 64Ks. It will be one of the world's largest VLSI manufacturing plant.

Moreover, NEC will become the world's largest maker of VLSIs when the Sagamihara plant is put into a full operation.

World sales of 64K RAM chips are estimated to reach $1.8 billion. Such huge demand in the near future has led NEC to decide on the new highly sophisticated VLSI plant at this moment. Demand for more integrated memory chips is strong from makers hoping to build smaller, more powerful and more reliable computers, calculators and other electronic devices.

Technically, production of 256Ks requires high precision techniques to shrink the electronic lines (or the distances between individual components on the chip) to 1.5 microns, compared to 3 microns for 64Ks.

NEC's aggressive move is expected to have a delicate impact on its rivals.

Seventeen vinyl chloride resin makers envisage four groups for joint sales

Presidents of nine major polyvinyl chloride producers have accepted a proposal of Haruhiko Takahashi, president of the Japanese PVC Association, to study the possibilities of starting four joint sales companies. Takahashi, also president of Kureha Chemical Industry Co., envisages that the sales consortia will help reduce the over-competition among the 17 PVC makers. His plan will be studied by the four groups until mid-November, when they will have an idea if the Takahashi proposal can be realized. He will receive reports until November 30.

The four consortia, he suggested, should be formed by the Mitsubishi, Mitsui, Industrial Bank of Japan (IBJ) groups and all others. The Mitsubishi consortium was proposed to consist of Shin-Etsu Chemical Co., Ryo-Nichi Co., Asahi Glass Co. and Mitsubishi Monsanto Chemical Co. The Mitsui group is composed of Kanegafuchi Chemical Industry Co., Mitsui Toatsu Chemicals, Inc., Denki Kagaku Kogyo K.K. and Toagosei Chemical Industry Co.

The PVC producers controlled by the Industrial Bank of Japan number five: Toyo Soda Mfg. Co., Central Chemical Co. (a PVC unit of Central Glass Co.), Nissan Chemical Industries, Ltd., Chisso Corp. and Tokuyama Sekisui Industry Co. (a joint venture of Tokuyama Soda Co. and Sekisui Chemical Co.) The last group of independent PVC makers are Nippon Zeon Co., Kureha Chemical, Sumitomo Chemical Co. and Sun Arrow Chemical Co. (an affiliate of Tokuyama Soda Co.)

Each envisaged group and its member companies will hold discussions on the sales consortia idea from the Kureha president. Takahashi said that the group formation may initially not be satisfactory but that the ideal arrangement can be made several years later. It seemed likely that he will try to form some groups — even if some makers refuse to join one. The proposal was made before the Industrial Structure Council comes up with its own recommendation.

The excessive PVC capacity caused the whole industry to lose money, including the largest maker, Shin-Etsu Chemical (about ¥400 million monthly). The industry lost its international competitiveness, causing imports to rise, as a result of rising costs for raw materials. Despite such problems, the 17-company industry is known for

(Continued on Page 10)

U.S. demands Japan to establish 'import goals' for its products

The U.S. Government, for rectifying the huge unfavorable balance of its trade with Japan, lately has begun strongly pressing the Japanese Government to set "import goals" for American products on the basis of government guidance and to ensure that these goals are met.

Specifically, Washington has begun to insist that the Government carry out such as the following points:

—It should make a public declaration on expanding imports, including disclosure of medium- and long-term policy aims.

—Japan should set import expansion targets on the value of American manufactures to be imported over a short term.

—The Japanese Government should consolidate its surveillance system to see that the goals set are achieved.

Informants said that the U.S. was planning to take up these points together with earlier topics — freeing of the finance and service industries, decontrol of farm products import, and liberalization of high technology product imports — at the meeting of the Japan-U.S. trade group in Tokyo in the latter part of November.

As to this, the Japanese Government is disinclined to accept the U.S. proposal on setting import goals from the standpoint that this has a strong coloring of "administered trade."

However, it is sorely perplexed as how to cope with the demands made by the U.S. and the European Communities for

(Continued on Page 5)

Citizen Digi-Ana TimeTrack
Tracking time with the speed of light
CITIZEN QUARTZ
DIGI-ANA
timetrack
CITIZEN

C

OFFERS 32-BIT HIGH-SPEED OPERATION

NTT claims turning out world's most integrated logic element

Nippon Telegraph & Telephone Public Corp (NTT) announced last week development of what it says is the world's most integrated logic element.

The logic VLSI (very large-scale integration) features 20,000 gates (logic circuits) integrated on a 12 millimeter-square chip. It can perform 32-bit high-speed operations, NTT said.

Such high integration has been attained by NTT's highly advanced CMOS (complementary metal-oxide-semiconductor) technology. The VLSI chip's maximum line width measures 2 microns, compared to 3.5 microns and 4 microns for similar 32-bit devices earlier developed by Bell Telephone Laboratories Inc. and Intel Corp., respectively.

Because of its CMOS structure, the new chip's power dissipation stands at as low as 750 milliwatts.

According to NTT, processors used in minicomputers can be replaced by a chip of the new logic VLSI.

NTT's achievement represents Japan's first successful attempt to develop more integrated processors, while integration of memory devices has been progressing smoothly as in the case of 64- and 256-kilobit dynamic random access memory (RAM) chips.

NTT plans to apply the logic VLSI to computers for the planned Information Network System (INS). The INS service, scheduled to start in fiscal 1982, is designed to offer a wide range of voice and non-voice services by integrating NTT's telecommunication and information processing capabilities. In such a system, processors capable of advanced functions and performance will play an important role and be required in great numbers.

Second color TV plant will be set up in Anaheim

Hitachi, Ltd. will build a second color TV assembly plant in the U.S. The plant, to be set up in Anaheim, Calif., is scheduled to start operation next spring, with a yearly production capacity of 50,000 sets.

The Tokyo company now has a color TV plant in Compton, Calif. built in April, 1979. The Compton plant is now producing 200,000 sets yearly, but strong color TV demand in the U.S. has led Hitachi to build the second plant.

Hitachi Consumer Products of America Inc., a wholly-owned subsidiary of Hitachi, already has acquired an old paper cup plant in Anaheim. Hitachi will shortly start remodelling it into a color TV assembly plant complete with sophisticated equipment.

Manitoba Telephone buys optical fiber

Sumitomo Electric Industries, Ltd. has received a big Canadian order for optical fiber telephone cables.

Manitoba Telephone Co. has ordered 120 kilometers of such cables from the Osaka company for the fiber optics public communications system in Winnipeg, the largest city in the Manitoba Province.

Sumitomo declined to reveal the contract value.

Sony will sell Mavica in U.S. in mid-1983

Sony Corp. will introduce in the U.S. market a filmless magnetic video camera, Mavica, in the middle of 1983, Chairman Akio Morita revealed last week in New York.

It will be priced at around $1,000, Morita added.

Exports of VTRs in September set new mark of 782,893 units

Video tape recorder exports hit a record 782,893 units in September, far topping the past highest monthly export volume of 641,000 units recorded in July, the Finance Ministry reported last week in its revised customs clearance statistics.

The September figure represented a 130 per cent increase (2.3-fold) from the year-earlier level. Shipments to the U.S. in September totaled 294,380 units, up 164 per cent, and those to the European Communities stood at 302,036 units, up 127.2 per cent.

VTR exports in the first nine months of 1981 totaled 4,833,733 units, up 116 per cent.

Color TV exports also continued favorable in September. They totaled 388,882 sets, up 21.7 per cent. Shipments to the U.S. in September rose 58.6 per cent to 80,789 units.

Color TV exports in the January-September period came to 4,087,431 sets, up 45.9 per cent from the same period of last year.

Meanwhile, production of VTRs in September exceeded the 900,000 unit-level for the first time to hit 960,000 units, up 130.1 per cent from same month of last year, according to the Electronic Industries Association of Japan.

The record so far had been 891,000 units registered in July.

Color TV production in September dropped 2.7 per cent to 920,000 sets, the association reported.

As a result, output of VTRs surpassed that of color TV sets for the first time in history.

Production & Exports of Home VTRs & Color TVs

(In units)

	September	Jan.-Sept. 1981
(Home VTRs)		
Production	[illegible] (+130.1)	[illegible] ([illegible])
Shipments	[illegible] ([illegible])	[illegible] ([illegible])
Inventories	[illegible] ([illegible])	—
Exports	[illegible] ([illegible])	[illegible] ([illegible])
Domestic shipments	[illegible] ([illegible])	[illegible] ([illegible])
(Color TV sets)		
Production	[illegible] (− 2.7)	[illegible] ([illegible])
Shipments	[illegible] ([illegible])	[illegible] ([illegible])
Inventories	[illegible] ([illegible])	—
Exports	[illegible] ([illegible])	[illegible] ([illegible])
Domestic shipments	[illegible] ([illegible])	[illegible] ([illegible])

Note: Percentage change from a year earlier in parentheses.

Toshiba ups initial capital outlay program

Toshiba Corp. has revised its fiscal 1981 capital spending program upward to ¥67 billion from the originally planned ¥57 billion.

Half of the increased ¥10 billion amount will be used for semiconductor manufacturing plants. The company plans to boost its production capacity for integrated circuits, microprocessors, memory chips and discrete semiconductor. Toshiba will spend a total of ¥28 billion in semiconductor-related facilities in fiscal 1981.

Of the remaining ¥5 billion, ¥2.5 billion will be for video tape recorder manufacturing plants, bringing investments in VTR plant and equipment to a total of ¥5.5 billion. By the end of next March, Toshiba hopes to increase its VTR production capacity to 180,000 units a month from the present 60,000 units.

The remaining ¥2.5 billion will be allocated to facilities related to video disc players, digital audio disc equipment and other innovative machines.

ELECTRICALS & ELECTRONICS

Hitachi will greatly boost output of 64K RAM chips

Hitachi, Ltd. last week revealed a plan to boost production of 64-kilobit random access memory (RAM) chips to 1 million chips a month next April from the present 700,000 chips. Until September, it was producing 300,000 chips monthly.

Hitachi expects surging demand for such highly integrated memory chips mainly from computer builders and other information processing equipment makers.

With the bold plan, Hitachi will be the nation's largest producer of 64Ks, far outdistancing its rival semiconductor makers. Industrymen say that Hitachi has started a big "offensive" in the semiconductor field.

At present, 64Ks are being produced by about 25 companies in Japan, the U.S. and Europe. Japanese producers have been stepping up mass production volume since the middle of this year in anticipation of greater demand for more sophisticated memory units than the preceding 16K and 4K RAMs. However, it turned out that demand was not so strong as producers expected earlier. As a result, prices of 64Ks plunged to around ¥2,000 or less per chip from ¥20,000 only a year earlier.

Ironically, however, the remarkable price plunge has stimulated possible customers to purchase 64Ks instead of 16Ks.

Hitachi seems to have confidence in a strong 64K demand in the near future. Managing Director Yasuo Miyauchi said that 70 to 80 per cent of production would be shipped abroad. His remark indicates that Hitachi already has secured large-lot customers mainly in the U.S. Miyauchi also said that 64K quotations have almost hit the bottom. This judgement is another factor for Hitachi's aggressive 64K production policy.

64K RAM Production Plans in 2nd Half of Fiscal 1981

(In 1,000 chips per month)

Hitachi	1,000
Fujitsu	[illegible]
NEC	[illegible]
Toshiba	[illegible]
Mitsubishi	[illegible]
Oki	[illegible]

During the first half (April-September) of its 1981 business term, sales of Hitachi's semiconductor and IC division rose 22 per cent from a year earlier to ¥95 billion. The company expects such sales in all 1981 will reach ¥205 billion, up 24 per cent from the 1980's ¥165 billion. The estimated sales value will account for 9.6 per cent of Hitachi's total sales. The composition ratio, which stood at 8.5 per cent last year, thus will finally near the 10 per cent level.

Besides Hitachi, other Japanese semiconductor makers are now spurring 64K RAM production. Fujitsu Ltd. is the runner-up with the monthly output planned at 800,000 chips at the end of next March. Nippon Electric Co. (NEC), Toshiba Corp., Mitsubishi Electric Corp. and Oki Electric Industry Co. follow them with plans to produce 300,000 chips monthly each as of the same date.

Among them, NEC is trying to catch up with Hitachi and Fujitsu most aggressively. The nation's largest semiconductor maker recently started building a plant capable of producing both 64Ks and 256Ks (JEJ-Oct. 27 issue). Depending on the market trend, industrymen predict, NEC might concentrate on production of 64Ks. This indicates that Hitachi and NEC will compete fiercely in the 64K RAM field in the next several years to take the leadership in the market.

Hitachi will use optical video disc formula

Hitachi, Ltd. said recently that it would introduce the optical laser-pickup format developed by N.V. Philips of the Netherlands for home video disc players that it plans to market in Japan in the near future.

The revelation was made when it announced its entry into the industrial video disc system market with optical-format models.

Hitachi will be the second company to employ the optical format in the domestic home video disc system market, following Pioneer Electronic Corp. which introduced Laser-Disc systems last month.

Hitachi's selection of the optical format will have a big impact on other possible suppliers of home video disc systems because Hitachi so far had been expected to opt for the VHD (video high density) format developed by Victor Company of Japan Ltd. (JVC) as far as the domestic market is concerned.

Hitachi's joining the "laser family" will deal a heavy blow to the "VHD family" (comprising JVC, Matsushita Electric Industrial Co., General Electric Co. of the U.S. and Thorn EMI Ltd. of Britain) which earlier announced a six-month delay in shipments of VHD systems from the originally planned October, mainly because of an incomplete technique to mass produce discs.

In contrast, Pioneer will be encouraged by Hitachi's move to the same banner.

In the U.S. market, Hitachi already has been marketing CED-format home video disc players. The CED-format, developed by RCA Corp. of the U.S., is one of the three major video disc formats.

Mitsubishi Electric develops solar cell with high rate of conversion

Mitsubishi Electric Corp. has developed a gallium arsenide solar cell having a light-to-electricity conversion rate of 18 per cent at 1 volt of electric pressure.

The photovoltaic efficiency rate is almost double the highest level so far attained by conventional silicon solar cells.

Mitsubishi has been developing GaAs solar cells at its LSI Development Laboratory at Itami, Hyogo Pref. for three years. It hopes to apply the newly developed batteries to Japan's future artificial satellites.

According to Mitsubishi, gallium arsenide has been under study in many countries as a potential substitute for silicon to make semiconductors and solar cells. Gallium arsenide has various advantages, including quicker electron passage, but it still poses problems, including less strength than silicon, requiring a thicker structure for application.

7H

3ritish Government wishes o set up Minifax venture

— With help of Japanese makers —

A Japanese-British venture) produce the Minifax — small csimile communication systems for home use — will be set p in Britain as sought by the ritish Government.

This is because six Japanese ompanies which jointly eveloped this system with ippon Telegraph & Telephone ublic Corp (NTT) recently pproved a proposal for such a nture made to NTT by the ritish Government.

The project stands to become e first instance of Japan's ooperation with Britain in ch a technology intensive inustry area. Many hope also it ill help do away with the equent trade frictions beeen the two nations over pan's overactive exports.

An official contract to start e joint venture is expected to signed before the end of ptember on the occasion of a rthcoming visit to Japan of eith Joseph, British Secretary State for Industry, because e approval of the plan and acmpanying conditions decided a recent meeting among TT and the six Japanese comnies have been immediately ade known to the British uthorities through Ichiro amanouchi, Japanese inister of Posts and Telecomunications then touring Brin.

The six Japanese companies e Matsushita Graphic Comunication Systems, Inc., excted to represent the sextet the joint venture, and oshiba Corp., Nippon Electric o., Hitachi, Ltd., Fujitsu Ltd. d Tamura Electric Works, td.

Intended for wide popularizaon of the facsimile comunication facilities, like telenes, radio and television ts, the Minifax system feares, among others, cheapness production cost and price. e average production cost is more than ¥100,000 a set, mpared with anywhere been ¥600,000 and ¥3 million big conventional sets used industrial corporations and her organizations.

The British Government has ken much interest in the inifax and decided to inuce such facilities into its planned electronic mail system in Britain for message senders and receivers to contact each other in facsimile-printed words through the telecommunication network of British Telecom (BT).

In its request, the British Government reportedly named Matsushita Graphic Communication Systems as a partner in the joint enterprise, possibly either with the Ministry of Industry or BT. The Matsushita group of Japanese companies led by Matsushita Electric Industrial Co. has been found to have best contributed to the British industrial redevelopment efforts.

The British side is said to be planning to let the Japanese hold the managerial initiative in it.

The six Japanese firms have approved the venture on condition that 1) the joint enterprise produce only the group's so far developed mini type of sets up to 148 by 210 mm in paper size, and consult the Japanese side for approval if it is to enlarge such sets to the international standard facsimile paper size of 297 by 210 mm, and 2) the joint firm will have a monopolistic right to sell the Minifax facilities only inside Britain.

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oster is slated to roduce pickups r DAD players

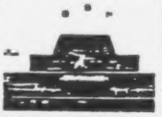
Foster Electric Co. plans to ass-produce pickups for gital audio disc players from xt June, following Olympus ptical Co.

The Akishima, Tokyo-based m is now preparing for cilities capable of producing ,000 units monthly.

The company earlier veloped the Compac pickup d has been offering samples possible producers of DAD ayers. It already has ceived inquiries from 22 of em.

Olympus plans to produce AOHS-L pickups from next ring (JEJ-Sept. 1 issue).

Massive color TV screen will be set up in baseball stadium



Matsushita Electric Industrial Co. has developed an ultra large screen color video display mainly for sports stadiums and auditoriums. Its screen measures 6.3 meters high and 8.4 meters wide, equivalent to the total screen size of about 440 20-inch color TVs. The screen is made up of 37,800 colored bulbs (180 vertically and 210 horizontally), instead of cathode-ray tubes used for Mitsubishi Electric Corp.'s similar model. The density of the picture element reaches 28 elements per square meter, double that of the CRT systems, thereby providing higher resolution and brighter images, Matsushita says. The first system will be in operation by next spring at the Nishinomiya Baseball Stadium near Osaka. The large-screen video display system costs around ¥12 million per square meter in the screen size.

ELECTRICALS & ELECTRONICS

Prices of 64K RAM drop to one-tenth of year ago

Prices of 64-kilobit random access memory (RAM) chips have been plunging remarkably since their appearance only a year ago.

The 64K RAM is the first-generation product of so-called very large-scale integrated circuits (VLSI), featuring highly-advanced microelectronics techniques.

According to industry sources, a 64K RAM now sells for ¥2,000 on a long-term contract basis, only one-tenth of the sample price of ¥20,000 offered in autumn, last year. Industrymen say that the price will continue to drop further to below the ¥1,000 level next year.

64K RAM mass-production plans announced in succession by Japanese and American semiconductor manufacturers are one of major factors for the drastic price plunge.

In anticipation of a further downward spiral of prices, computer builders, peripheral equipment makers and other major consumers of 64K RAMs are holding down their purchases, causing an "excessive supply" in the market.

Suppliers thus will be forced to review their business strategies for 64K RAMs.

Transactions of 64K RAMs, however, are still very slim.

At present, makers of personal computers and peripheral equipment are the biggest customers. But they buy the highly integrated chips only in a lot of 1,000 units a month. Prices are set on a quarterly or monthly basis. According to a semiconductor dealer, only several tens of thousands units are now on the market.

Another factor that makes people wary of buying 64K RAMs is their still low evaluation of the memory chips as to efficiency and quality. They prefer the earlier-made "reliable" 16K RAMs to the 64K to avoid possible defects. Actually, the price of four 16K RAMs, equivalent in capacity to a single 64K RAM, is almost the same as that of a 64K because a 16K RAM now sells for ¥200-300.

At present, semiconductor makers are racing to establish 64K RAM mass production techniques to vie for larger shares of the VLSI market. Not a few of them, however, seem to have faced difficulty in raising production yields to a commercially feasible level.

The current market price of 64K RAMs, which came down in expectation of mass production, does not necessarily reflect the true situation, some industrymen hold.

Fujitsu will offer technology to ICL

Fujitsu Limited last week reached basic agreement on extending its highly-advanced computer and semiconductor manufacturing techniques to ICL of Britain, according to industry sources.

Fujitsu is expected to sign a formal contract with the British computer builder late this month at the earliest.

The Fujitsu-ICL partnership will be the first Japan-Britain cooperation in the field of high technologies.

Sharp decides to use VHD format

Sharp Corp. has decided on a policy of adopting the VHD (Video High-Density) format for video disc players that it plans to market in Europe from next July.

With this decision, Sharp will apply the VHD format to all of its video disc players to be sold in the world, including the U.S.

The Osaka consumer electronics maker has opted for the Japanese-developed format as it judged that VHD players can be connected easily with TV receivers based on PAL, SECAM, NTSC and other broadcasting formats. Mass-production of a single model will greatly elevate production efficiency, it feels.

Sharp's option for the VHD format will encourage Victor Company of Japan Ltd. (JVC), the developer of the format and leader of the VHD group, which earlier announced a six-month delay in marketing discs and players.

Sanyo receives big Egypt order for TV parts

Sanyo Electric Co. and trader C. Itoh & Co. have won an ¥8 billion Egyptian order for color TV parts and components, equivalent to 100,000 assembled sets.

The Egyptian state-run household electric appliance company, Benha Co. for Electronics Industries, will assemble them for marketing in Egypt under the Sanyo/Katron brand.

The contract calls for Sanyo's full-scale assistance in manufacture, marketing, advertising and maintenance services.

Sanyo will deliver parts and components for 100,000 color TV sets within three years.

Payment will be made in a lump sum in yen.

Semiconductor production climbed in first half

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Semiconductor production in the first half (January-June) of 1981 rose 24 per cent from the year-earlier level to ¥491,617 million, according to the Electronic Industries Association of Japan.

The association, which compiled the figures from the Ministry of International Trade & Industry's production statistics, ascribed the rise mainly to brisk demand from manufacturers of video tape recorders, color TV sets and office automation equipment.

Semiconductor exports, however, dropped 2.5 per cent to ¥119,876 million because of poor demand from the U.S. and major European countries. Imports gained 6.5 per cent to ¥71,220 million. Both export and import figures are based on the Finance Ministry's customs clearance statistics.

Semiconductor output broke down into ¥175,516 million for discrete semiconductors, up 27.1 per cent, and ¥316,101 million for integrated circuits, up 22.3 per cent. The rate of increase of discrete semiconductors topped that of ICs for the first time in several years, the association said.

Production of linear ICs, a major component for VTRs and audio equipment, shot up 46.8 per cent, while bipolar-type digital ICs, used mainly for computers, also recorded a remarkable gain of 36.6 per cent. In contrast, MOS (metal-oxide-semiconductor) digital ICs, which had been pulling the IC industry, gained merely 10.2 per cent. The slowdown was ascribed to the plunge in prices of 16-kilobit random access memory (RAM) chips, which are one of representative MOS-type digital ICs. In unit terms, output of MOS-type digital ICs gained 44 per cent, the association said.

Noteworthy is that exports of unpackaged discrete semiconductors increased 25.4 per cent because semiconductor makers heavily shipped them in the form of silicon wafers mainly to their assembly plants in Southeast Asia. A part of them re-entered Japan in product forms, as shown in the 40.2 per cent gain in diode imports and the 34.3 per cent rise in transistor imports.

Exports of packaged ICs dropped 9.9 per cent, while those of unpackaged ICs gained 19 per cent. The association attributed this to greater production in the U.S. of Japanese semiconductor makers.

Imports of unpackaged ICs rose 11.8 per cent as some American semiconductor makers have been stepping up assembly in Japan.

Production, Exports & Imports of Semiconductors in 1st Half of 1981
(In millions of yen)

	PRODUCTION
Total	491,617 (+24.0)
1 [illegible]	175,516 (+27.1)
a. [illegible]	[illegible]
b. [illegible]	[illegible] (+11.7)
c. [illegible]	[illegible]
d. [illegible]	[illegible]
e. [illegible]	[illegible]
f. [illegible]	[illegible]
g. [illegible]	[illegible]
h. [illegible]	[illegible] (− 7.2)
2 [illegible]	316,101 (+22.3)
a. [illegible]	[illegible]
1 [illegible]	[illegible]
2 [illegible]	[illegible]
[illegible]	[illegible]
MOS	[illegible]
b. [illegible]	[illegible]
1 [illegible]	[illegible] (+ 9.1)
2 [illegible]	[illegible] (+17.2)

	EXPORTS	IMPORTS
Total	119,876 (− 2.5)	71,220 (+ 6.5)
1 [illegible]	[illegible] (− 3.0)	[illegible]
a. [illegible]	[illegible]	[illegible]
b. [illegible]	[illegible] (− 0.4)	[illegible]
c. [illegible]	[illegible] (− 3.9)	[illegible]
d. [illegible]	[illegible] (− 7.1)	[illegible] (− 3.3)
2 [illegible]	[illegible]	[illegible] (− 3.3)
a. [illegible]	[illegible]	[illegible]
b. [illegible]	[illegible]	[illegible]

Note: [illegible]
Source: [illegible]

NEW PLANTS FOR VLSI USE INCREASE

Semiconductor equipment makers are cutting into American share

With the dawn of the so-called VLSI (very large-scale integrated circuit) age, rivalry has been intensifying among Japanese and American semiconductor production equipment manufacturers.

Japan's semiconductor production equipment market has been expanding at an annual rate of about 30 per cent on the strength of active plant and equipment investments by semiconductor manufacturers and the fast tempo of technological innovation.

A number of Japanese companies have entered into the promising market by making the most of their high-precision technology. They have grown so fast as to erode the marketing shares held by American forerunning suppliers, such as Perkin-Elmer Corp. and GCA Corp.

Japanese producers have been rushing to build VLSI production equipment manufacturing plants and carry out marketing campaigns.

Canon, Inc. and Nippon Kogaku K.K., both noted camera makers, are now constructing plants to specialize in production of exposure systems. Kokusai Electric Co. has started building a plant to produce a variety of equipment for semiconductor production. Takeda Riken Kogyo K.K., a Tokyo maker of LSI testers, is now expanding production capacities, while Ameiva Corp. is building an etching equipment manufacturing plant. Ameiva is a Fuchu, Tokyo-based company jointly owned by Nippon Electric Co. and Varian Associates of the U.S.

These companies are trying to capitalize on the rapid expansion of the semiconductor production equipment market. According to the Electronic Industries Association of Japan, the market of the semiconductor production-related industry grew to ¥400 billion in 1980, compared to ¥800 billion for the semiconductor production industry. The ¥400 billion "peripheral" market roughly breaks down into ¥100 billion for semiconductor production equipment, ¥100 billion for "clean rooms" and other environment protection equipment, ¥50 billion for metallic materials, ¥40 billion for silicon wafers, ¥60 billion for packaging materials, ¥25 billion for photo masks and ¥10 billion for chemicals, etc.

In particular, semiconductor production equipment output is estimated to reach ¥120-140 billion this year, according to industry sources. The output value will continue to grow at a yearly rate of around 20 per cent in the coming several years, they added.

This is mainly because Japan is going to become the world's largest production base for VLSIs. They expect a quantitative expansion in demand and greater demand for higher value-added equipment.

Until a few years ago, American producers had controlled nearly 70 per cent of Japan's semiconductor production equipment market. However, Japanese makers have been steadily eroding U.S. producers' marketing shares. It is said that Japanese and American producers now equally divide the market.

In an attempt to stop the sliding, Perkin-Elmer and GCA plan to introduce new products in the Japanese market next year. Teradyne, Inc., an automated LSI testing equipment maker, has worked out a Japan Plan to further cultivate the Japanese market. Other American producers are now planning rollback programs, observers say.

New Plant Construction
by Major Semiconductor Production Equipment Makers

	Floor space (sq meters)	Date of completion	Major production items
Canon	10,000	End of 1982	Exposure systems
Nippon Kogaku	3,000	April 1982	Exposure systems
Kokusai Electric	3,000	June 1982	Diffusion systems and CVD systems
Ameiva	3,400	April 1982	Etching equipment
Takeda Riken	700	December 1981	LSI testers

Note: CVD stands for chemical vapor deposition. [illegible]

Japanese IC exports to U.S. record 19% drop from year ago

Japan's integrated circuits trade with the U.S. turned against Japan in the first eight months of this year.

According to statistics recently compiled by industry sources, Japan's IC exports to the U.S. during the January-August period dropped 19 per cent from the same period of 1980 to ¥41.8 billion. The export value was ¥1.6 billion smaller than the ¥43.4 billion worth of imports during the same period, which represented an 8 per cent year-to-year decline.

The net imports of ¥1.6 billion reversed from the ¥4.5 billion net exports of a year earlier, the sources said.

They ascribed the poor shipments to the U.S. mainly to high interest rates in the country which helped cool corporate investments in plants and equipment. Particularly, shipments of memory chips slowed down.

Poor market quotations of ICs also discouraged the export-mindedness of Japanese semiconductor makers, the sources added.

Japan's IC imports from the U.S. did not drop as sharply as exports since leading U.S. semiconductor makers have established firm marketing footholds in Japan, especially in the field of microprocessors.

Japan's surplus in IC trade with Europe also narrowed greatly.

Total IC exports during the eight-month period reached ¥121.2 billion, down 1.6 per cent, while imports came to ¥72.9 billion, down 0.2 per cent. The trade surplus of ¥48.3 billion was down from the ¥50 billion a year earlier, the informed sources said.

Toshiba envisages advancing into CAD equipment market

Toshiba Corp. recently revealed a plan to move into the promising computer-aided designing (CAD) equipment market next summer.

The Tokyo company plans to introduce a general-purpose system incorporating a high-speed super minicomputer.

With Toshiba's revelation, all of Japan's leading general-purpose computer builders, including Fujitsu Ltd., Nippon Electric Co. and Hitachi, Ltd., will be handling CAD systems next summer.

As many information processing equipment makers and traders already are in the market, competition will further intensify in the CAD system market, industrymen observe.

Fujitsu receives ¥6 billion order from Colombian city

Fujitsu Ltd. and trader C. Itoh & Co. have won a ¥6 billion contract from Colombia's Medellin City telephone corporation for 11 stations (total of 50,000 circuits) of tandem digital electronic telephone exchange equipment and PCM (pulse-code modulation) carrier equipment.

Delivery will start in the latter half of 1983 and be completed by the end of 1984.

The contract accompanies credits by the World Bank.

The Colombian order will be Fujitsu's fifth export contract for the exchanges (trade-named FETEX-150) but the largest ever.

ELECTRICALS & ELECTRONICS

Materials Research will make sputtering equipment

By TATSUO HORIKAWA
Nihon Keizai Correspondent

NEW YORK — Materials Research Corp., a leading American semiconductor production equipment manufacturer, will produce sputtering equipment in Japan, it announced recently. Sputtering equipment is instrument to apply extremely thin films of metals and ceramics to a large variety of semiconductor substrates.

MRC recently agreed with Morihiko Hiramatsu, governor of Oita Prefecture, to build a sputtering equipment manufacturing plant in the prefecture on Kyushu Island, which is called "Silicon Island" after California's Silicon Valley.

MRC, which controls 60 per cent of the world's sputtering equipment market, will be the first foreign semiconductor production equipment manufacturing company setting up a production plant in Japan.

Construction of the plant is scheduled to begin next spring, and it will start operations in early 1983. Details of the project will be determined early next February when President Sheldon Weinig is to visit Japan.

The growing demand for such equipment from Japan's semiconductor industry has led MRC to move directly into the Japanese market. The American company hopes to take advantage of Japan's high-quality labor force and make the plant a production base for shipments to South Korea, Taiwan and other Southeast Asian nations.

President Weinig hoped that his company's advance into Japan would help ease the trade frictions between Japan and the U.S.

MRC is a fast growing company with sales of $71 million last year. Besides sputtering equipment, the Orangeburg (N.Y.)-based company supplies high-purity metals and ceramics to the electronics and telecommunications industries.

Mitsubishi wins foreign railway equipm't orders

Mitsubishi Electric Corp. has been winning big orders from abroad for electrical equipment for rolling stock. The contract value of the three orders that it has received since the beginning of the current fiscal year totaled ¥50 billion, about five times as large as Japan's total exports of such equipment in fiscal 1980. In order to meet these massive orders, its Itami Works in Hyogo Pref. has been operating at capacity.

The biggest order was that issued by Mexico City's subway authorities, worth ¥40 billion. The Mexican customer seeks motors and thyristor chopper controlling equipment for nearly 1,000 coaches.

Recently, Mitsubishi has been awarded a ¥4.5 billion order by the Spanish national railway authorities for motors and controlling units.

The most recent order was that by Australia's New South Wales railway corporation for motors, controlling units and power generators. The order is worth about ¥5 billion.

Hitachi will increase production of MOS type video cameras six times

Hitachi, Ltd. plans to boost output of solid-state video cameras by six times to 6,000 units monthly from next spring.

Its VK-C1000 video camera, incorporating a metal-oxide-semiconductor (MOS) imaging element, has been selling fast because of its clear reproduction of colors and compactness in size.

The 10 millimeters by 8.5 millimeters MOS imaging element replaces the bulky 2/3-inch image pickup tube for conventional video cameras, making the camera body more compact, lightweight and easy-to-operate.

Hitachi has been leading other video tape recorder system makers in marketing of solid-state video cameras. Sony Corp., Sharp Corp. and some other companies are going to follow Hitachi with their charge-coupled devices (CCDs), a solid-state imaging element equivalent to Hitachi's MOS chip.

It is expected that solid-state cameras will replace the conventional image pickup tube types in the near future. Hitachi's move indicates that the Tokyo company is trying to take advantage of the likely trend before the entry of its competitors into the solid-state camera market.

The Hitachi plan calls for installing another video camera production line at its Tokai Works, near Tokyo, to boost its solid-state video camera output by six times to 6,000 units a month.

Sanyo is going to make color TVs in Britain

Sanyo Electric Co. is planning to assemble color television sets in Britain.

The Osaka consumer electronics maker is now negotiating with N.V. Philips of the Netherlands to purchase one of two color TV manufacturing plants operated by the Dutch company's British subsidiary, it was learned last week.

If the negotiations go smoothly, Sanyo will start production of color sets from next August. Production of 60,000 sets is planned in the initial year. The products will be sold solely in the British market. Yearly production volume will be doubled to 120,000 sets in three years to export a part of the products to other EEC nations.

The plant concerned is located in Lowestoft, Suffolk County, some 200 kilometers northeast of London. It has a tract area of 62,500 square meters.

The British factory will become Sanyo's 31st manufacturing plant abroad but the first in the European Common Market.

Exports of home VTRs in Oct. marked new record

Exports of home video tape recorders, including a small amount of video disc players, hit a record 980,131 units in October, according to the Finance Ministry's customs clearance statistics.

The October figure, 2.4 times the year-before level, exceeded the past highest volume of 782,-880 units registered in the preceding month.

Shipments to the U.S. reached 380,367 units, up 177.2 per cent.

NIKKEI SANYGO SHIMBUN
December 16, 1981
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VLSI War (Part 1) -- Competition for Increased Production Overheating -- NEC and Hitachi competing with Each Other toward Top Place; Toshiba,Etc., Taking Specialization Measures, Avoiding Competition

The Japanese semi-conductor industry will join the new ¥1-trillion industries as early as fiscal 1981. As if to fall in step with the rapid expansion of the market scale, the development of ultra-modern technology is also making rapid progress, and the industry circles are now in the midst of a VLSI (very large scale integrated circuits) war. Competition in the mass production of ultra-modern products is being accelerated, on the one hand, while on the other, severe struggles among various companies are being developed for the obtaining of large users. Also, U.S. forces are eagerly watching for a chance for counter-attacks. The peripheral equipment industry also is on the alert, in search of business opportunities. The front line of the VLSI war is reported as follows:

NEC Hastening Monthly Production of One Million 64-Kilo-Bit RAM's

At 10:30 a.m. on November 2, NEC Vice-President Atsuyoshi Ouchi took out several sheets of data from an inner pocket of his suit, as soon as he entered the Directors' drawing room on the 22nd floor in the Head Office building in Tamachi, Tokyo. He said to a reporter who visited him, "Our company also has decided to produce one million 64-kilo-bit RAM's (memories to write in and read out, from time to time), monthly."

In the data which Vice-President Ouchi read, a plan for greatly increasing the production f 64-kilo-bit RAM's was written. This is a fresh plan which was decided through talks between Vice-President Ouchi and President Tadahiro Sekimoto, which were held at the end of October, only several days before. The scale of production of 64-kilo-bit RAM's by this company at the end of October was 300,000 RAM's monthly. Under the plan, this is to be increased by 150,000 RAM's every month from November, and it is to be brought to a structure to produce 1,050,000 RAM's monthly at the end of March next year. It is a bullish plan for increased production, to increase the output by more than three times in half a year. In this company, monthly production of 64-kilo-bit RAM's has already exceeded 500,000 RAMS's in December this year.

NEC has announced the plan for the great increase of production because it was stimulated by "Hitachi, a fair competitor" (NEC Board ChairmanKohi Kobyashi). On October 26, prior to NEC's announcement of its plan for increased production, Hitachi Managing Director Yasuo Miyauchi said as follows at the meeting to announce the interim settlement of accounts in September: "At the end of March next year, the monthly output of 64-kilo-bit RAM's will be increased to one million RAM's." Thus, the plan for increased production to increase the scale of production at the end of September -- 500,000 RAM's -- double in half a year was quickly declared internally and externally.

This news on the increased production by Hitachi promptly spread to NEC's semi-conductor plants which are scattered throughout Japan. The newspaper report saying that, "Hitachi will produce one million 64-kilo-bit RAM's monthly" was put up the next day at various places of the plant of Kyushu NEC, which is the biggest production base. Thus, it was eagerly waiting for a decision by the top management at the Head Office, saying, "What on earth will our company do?"

Typical "Industry of Sure-Victory-by-the-First-Move Type"

Semi-conductors are a typical industry of the sure-victory-by-the-first-move type. "If ultra-modern products are produced belatedly, there will arise the vicious cycle of buyers being taken away when the products appear on the market, and not being able to recover the next investment because the price falls rapidly" (Hitachi Board Chairman Hirokichi Yoshiyama). Some semi-conductor manufacturers of the U.S. retreated from or gave up the production of 64-kilo-bit RAM's because they firmed up the judgement that if they start production in the face of the big offensive by Japanese manufacturers, it will be too late.

NEC and Hitachi, which rank first and second in Japanese semi-conductor industry circles, have started increasing the production of 64-kilo-bit RAM's in competition with each other, simply because they are thinking of securing a position which is even slightly adavantageous, by going ahead. As is often said, the 64-kilo-bit RAM is the first round of VLSI products. It can be said that the competition between NEC and Hitachi, with an eye on the 256-kilo-bit RAM, which is the next ultra-modern product, has just been started.

Toshiba, whose development of independent VLSI products has suddenly become active among the companies engaged in similar business, with a side glance cast at such moves of NEC and Hitachi, has recently announced that it has developed 64-kilo-bit RAM's of the static type and will start full-scale shipments from March next year. NEC and Hitachi are planning to increase the production of 64-kilo-bit RAM's of the dynamic type. Compared with the 64-kiko-bit RAM's of the dynamic type, those of the static type require a degree of integration which is three or four times as high, to obtain the amount of memories of the same capacity. However, they have the advantage that the designing of circuits to be connected with other LSI's is easy, and that the electric power to be consumed is small, too.

The degree of integration of the 64-kilo-bit-RAM's of the static type, which have been developed by Toshiba, is nearly three times that of the dynamic type, amounting of 400,000 pieces, and the cost is higher, too. However, it is thinking of making up for its lag behind NEC and Hitachi by cultivating a new market for OA (office automation) equipment, measuring instruments, etc., which are well adaptable to the static type.

Sony and Sharp Mass-Producing CCD's

Sony and Sharp are doing their utmost for the mass production of CCD's (charge cupped devices) which are being brought into the limelight as an eye of new electronics. The scope of application of CCD's is wide, including facsimiles, video cameras of small size and of light weight, and magnetic cameras of the future, which do not require film. They are VLSI's whose rapid growth is expected in the field of public welfare.

In Sony, the development of CCD's is a President project. From the spring of next year, when the special plant whose construction is being pushed at present in Kokubu, Kagoshima Prefecture, will be completed, mass production of CCD's will be started in the unit of 10,000 devices per month. Sharp also is constructing a CCD mass-production plant at its Tneri Plant in Nara Prefecture. It will produce 20,000 to 30,000 devices monthly in June next year.

It can be said that this is a manifestation of the budding of moves to survive in the VLSI age through the development of independent products, avoiding front competition with NEC and Hitachi, which lead the industry circles by improving the degree of integration of memories.

VLSI's requires huge amounts of funds for research and development and facilities investments. According to tentative calculations by ICE, which is an influential semiconductor consultant company of the U.S., there is a result of surveys to effect that the cost for the construction of a standard VLSI plant will increase from the $23 million in 1980 to a little more than $50 million in 1985.

The amount of facilities investments in the semiconductor sector of NEC, which holds top place in the industry circles, in fiscal 1981, in ¥41 billion., This accounts for 12 percent of the estimated sales in this sector--¥342 billion. Other companies engaged in similar business criticize NEC, saying that "NEC makes excessive facilities investments." However, it can be said that NEC is thinking that it must make such a huge amount of investments to live through the VLSI age.

It seems that the various semi-conductor companies are being pressed to make a severe choice -- whether to stand the burden of huge funds and survive through competition in mass production, or whether to live through the VLSI age through the development of independent, favorite products.

Major Manufacturers' Plans for Producing 64-Kilo-Bit RAM's

(As of the end of March, 1982, unit: 10,000 RAM's)

NEC:	105
Hitachi:	100
Fujitsu:	60
Toshiba:	30
Mitsubishi Electric Machinery:	30
Oki Electric Industry:	30

(Reporter KATO)

To be continued)

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NIKKEI SANGYO SHIMBUN
(Page 5) (Full)

December 17, 1981

VLSI War (Part 2) -- Fall in "Bogged down" Market -- To One-Tenth in a Year: Users' Enthusiasm for Purchasing Stimulated

The rapid fall in the price of 64-kilo-bit RAM's, which are said to be the first round of VLSI (very large-scale integrated circuits), was much in the newspapers in early September this year. At that time, a director of a certain major semi-conductor-manufacturing company challenged a reporter, saying as follows: "Do you know how much injury our company suffered because of the newspaper report on the sharp fall in the price? It is ¥5 billion!" At the Tokyo Securities Exchange, the prices of main-stay electric machinery shares fell rapidly from the middle of August because of foreign investors' over-selling. Above all, the worsening of the semi-conductor market, represented by 64-kilo-bit RAM's accelerated the lowering of the prices of major electronic shares of NEC, Fujitsu, etc. In the case of the above-mentioned manufacturing company, which was scheduled to issue debentures convertible at the market price in Europe, the plan for procuring funds was greatly upset because the stock price fell, and this resulted in the "protest" by the director.

The trend of the product market is extremely important in grasping the whole picture of semi-conductor business. The 64-kilo-bit RAM, in particular, appeared with great fanfare as a product telling the opening of the VLSI age, and therefore, the impact when the tremendous speed of the fall in the price was spotlighted was great.

Since the fall of last year, Japanese and US semiconductor manufacturers have begun to deal with this product with ultra-modern technology unanimously and on a full scale. The price of each sample shipped was ¥20,000. However, it fell to ¥2,000, one-tenth, in September this year, one year later. It is natural for the persons responsible for sales in various companies to have turned pale at this sharp fall. However, the worsening of the market was true.

Mass Production of 64-Kilo-Bit RAM's Runs Ahead Alone

The "learning curve" is a term which has become well-known at a bound as a result of surveys by the Boston Consulting Group of the U.S. This is a rule of experience in semi-conductor business, to the effect that when a cumulative output increases double, the price falls by about 30 percent. "Manufacturers with large amounts of production are more capable of lowering cost, and they are able to increase the profit rate. As a result, they can have an advantage in share competition. When the share increases, this rebounds on the increase in the output, and this leads to more favorable conditions."

The Japanese semi-conductor industry caught up with the U.S. forces in "Silicon Valley," which is a mecca of semi-conductors, because it adopted the management strategy of giving primary thought to the effect of mass production, as a faithful adherent of the "learning curve."

The phenomenon of the fall in the price of the 64-kilo-bit RAM, which phenomenon was described even as a "tragic aspect," originated from the attempt to carry out this rule of experience intensively for a short time. As a conclusion, the competition for increased production among various semi-conductor companies escalated, when it was not accompanied by users' demand, and only the price ran ahead under the situation where many things did not appear at the stage of distribution. This brought about the sharp fall in the market to one-tenth in one year, which fall had not been experienced by the persons connected with semi-conductor business.

Why did the competition overheat to such an extent? As a memory product, which is the ace in semi-conductor business, the 64-kilo-bit RAM has appeared this year, after the golden age of the 16-kilo-bit RAM continued for four years. It is said that the 256-kilo-bit RAM in the next generation will appear from 1985. This is an "Olympic item" whose memory capacity increases by four times and which is replaced by another main-stay item every four years.

"Destruction of Price" Calms down, at Long Length

"VLSI technology will decide the rise and fall of the electronic industry in the 1980's." So saying, all the major semi-conductor manufacturers of Japan announced themselves as suppliers of 64-kilo-bit RAM's. Mitsubishi Electric Machinery, which is a late-comer in the 16-kilo-bit RAM market one generation ago, and even Oki Electric Industry, which had no actual record at all, participated for the first time. It is for this reason that it is bantered as an "Olympic item on which there is significance in participation." It is a natural consequence that the price will fall rapidly if the amount of supply increases tremendously when it is not accompanied by actual demand."

This "destruction of prices" is now calming down, at long length. Even so, the prospect is strong that the price of the 64-kilo-bit RAM will become ¥1,000 early next year. Correctly, it can be said that such a downward curve until the beginning of this fall as to "slide down a cliff" is returning to the "step of the ordinary fall in cost for memory products at a gradient of 45 degrees."

For the various semi-conductor companies, the sharp fall in the price of the 64-kilo-bit RAM went against the grain. This is because establishment of the prices was upset greatly under their sales plans for this year, when the commercial war as to this product was to be started. However, this fall in prices caused a "welcome miscalculation," on the other hand. The tremendous competition in the lowering of prices stimulated users' enthusiasm for purchases, and as a result, it caused the VLSI age to become full-fledged quickly.

In regard to the circumstances in this connection, Vice-President Atsuyoshi OUCHI of NEC, which ranks first in the industry circles, did not change the following prospect, from beginning to end: "It will be from 1982, that the 64-kilo-bit RAM will play the leading role in the semiconductor market." Looking askance at other companies engaged in similar business, which raced ahead in the competition for increased production, NEC did not readily join this race. The "judgment" based on the marketing research by the information strategic units which NEC spread both at home and abroad, served as its self-confidence in the "view that the 64-kilo-bit RAM will play the leading role in 1982."

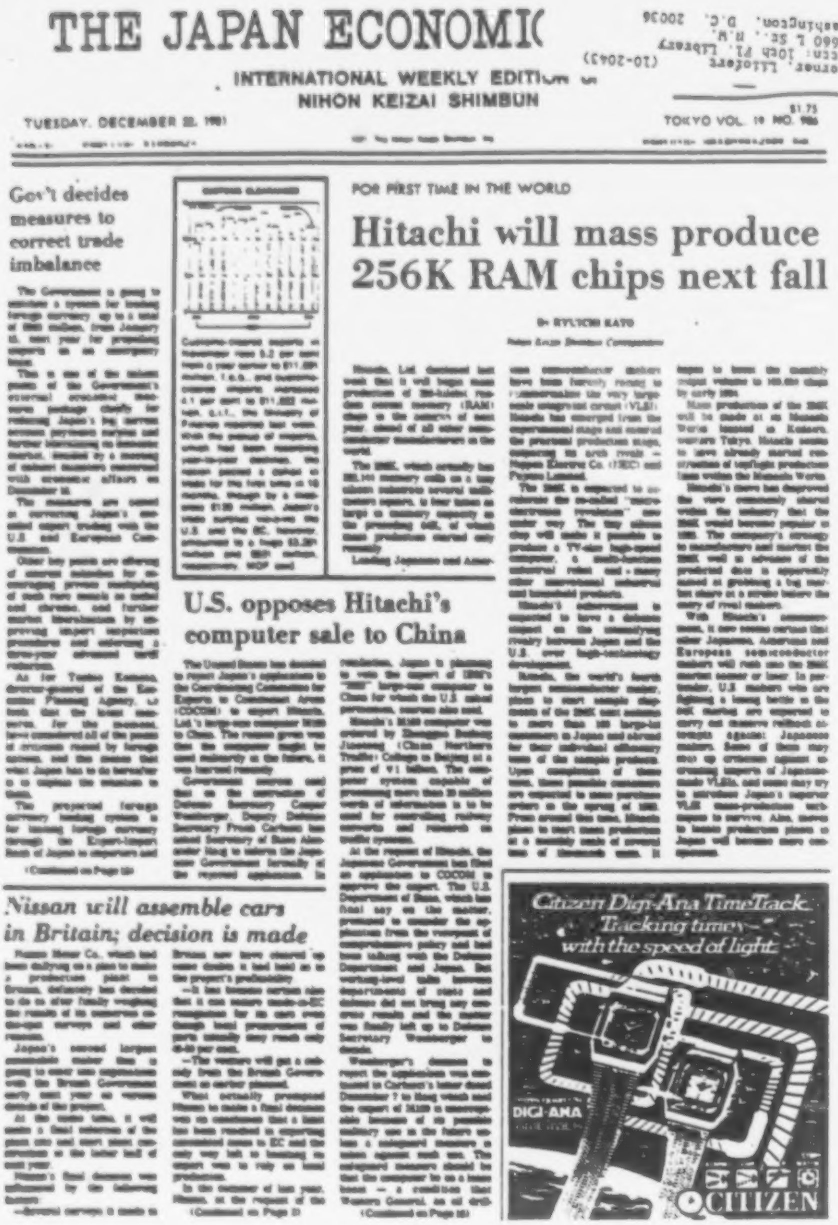
As Vice-President OUCHI read the information strategic units' research reports which he obtained after the start of November, he is said to have though that "the rapid recovery of demand for the 64-kilo-bit RAM exceeds my expectations." In the reports, the names of about 130 enterprises which had reported on the passage of the examination of the samples, which NEC had shipped to European and American users, were listed. It is said that among them, "seven of the 11 major computer manufacturers in Europe and America, such as Honeywell, are included."

Shares Will Become Clear from Early Next Year

Even in the light of the single fact that facilities investments amount to a huge sum, the VLSI war, which was started with the appearance of the 64-kilo-bit RAM, is forcing Japanese semi-conductor manufacturers to engage in a heavy-load race. It can be said that the price competition was a "test" as to whether they can stand this race or not. As far as is viewed at the present time, no companies seem to have dropped out in the offensive-defensive battle among NEC, Hitachi, Fujitsu, Toshiba, Mitsubishi, and Oki Electric, which battle was developed as to what company will hold price leadership. However, there are also new moves, such as Toshiba's deciding to expand the kinds of VLSI products.

The results of the struggles for users will certainly become clear after early next year, in the situation where users' demand will mount, centering on computer and communications equipment industry circles. Real ability is yet to be truly questioned in the load race among the various companies which have outlived the price competition. (Reporter NONAKA)

(To be continued)



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Gov't decides measures to correct trade imbalance

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FOR FIRST TIME IN THE WORLD

Hitachi will mass produce 256K RAM chips next fall

By RYUICHI KATO

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U.S. opposes Hitachi's computer sale to China

[illegible]

(Continued on Page [illegible])

Nissan will assemble cars in Britain; decision is made

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(Continued on Page 3)

Citizen Digi-Ana TimeTrack
Tracking time—
with the speed of light
DIGI-ANA
CITIZEN

ELECTRICALS & ELECTRONICS

Mitsubishi CI takes over Exxon optical info division

Mitsubishi Chemical Industries, Ltd. has taken over Exxon Corp.'s optical information system division through its subsidiary, Mitsubishi Chemical Industries America Inc. of New York.

The Tokyo chemical maker announced last week that it had agreed to purchase the American conglomerate's Optical Information Systems division for about $7 million.

With the take-over, Mitsubishi CI has entered the promising but competitive optical information system market.

Optical Information Systems, which Exxon established in 1977 as a division of Exxon Enterprises, now manufactures and markets semiconductor laser elements. The Elmsford (N.Y.)-based division has a payroll of 100.

The American subsidiary of Mitsubishi CI has set up a 100 per cent-owned subsidiary, named Optical Information Systems Inc., by taking over OIS's manufacturing and marketing units and hiring all the employees. Mitsubishi CI hopes the new company will boost sales to ¥1 billion next year and further to ¥4 billion in 1985 from this year's ¥300-400 million (estimated).

Mitsubishi CI has been lessening its dependence on low value-added basic chemicals and producing organic optical semiconductors, analytical devices, diagnostic equipment and toners for copying machines.

ricsson places big 64K RAM order

Ericsson Telephone Co. of Sweden has placed large-lot orders for 64-kilobit random access memories (RAMs) to Nippon Electric Co., Hitachi, Ltd. and Oki Electric Industry Co., was learned last week.

The Stockholm company plans to incorporate them into electronic telephone exchanges.

Ericsson reportedly seeks 1,000 units of 64K RAMs each from the three Japanese makers. The amount accounts for 10 and 25 per cent, respectively, of the present monthly production capacity of NEC and Oki.

This is one of the biggest foreign orders for 64Ks ever received by Japanese producers.

ki will treble mall printer prod.

Oki Electric Industry Co. will treble output of small printers for small business computers to 25,000 units a month from the present 8,000 sets.

The Tokyo company has been swamped with large orders from several American companies for supply of printers on an OEM (original equipment manufacturer) basis. Such orders have amounted to 6,000 units in yearly terms.

Oki has been exporting its miniature small printers to the U.S. and Europe. Last year's export volume stood at 40,000 sets.

Nippon Gakki will enter computer business next yr

Nippon Gakki Co., a Yamaha-brand musical instrument maker, will move into the computer business in January.

The Hamamatsu (Shizuoka)-based company has developed the YIS (Yamaha Integrated System) home computer system comprising a personal computer, a video disc player, piano player, a music keyboard and a variety of electronic musical instruments.

A combination of either of them offers various entertainment, a Nippon Gakki spokesman said.

The company will first introduce a personal computer and piano player in January. They will sell for ¥[illegible] and [illegible], respectively.

G.E. of Britain gets right to Hitachi process

Hitachi, Ltd. has licensed General Electric Company of Britain to exploit its technology to design and manufacture windings for ultra high-voltage transformers.

The British licensee will dispatch several engineers to Hitachi to have them learn the Hitachi technique.

Production will be undertaken by GEC's transformer division, GEC Power Transformer.

The licensing contract is effective for five years, starting from the date of shipment of the first product.

AMT EYES OPERATION FROM 1983

U.S. semiconductor equipment makers are rushing into Japan

With the advent of the so-called VLSI age, American semiconductor production equipment manufacturers have been advancing directly into Japan.

They are greatly interested in the high growth of Japan's semiconductor industry. They also are trying to maintain their present shares in the Japanese market on the strength of local production.

Following GCA Corp. and Materials Research Corp., Applied Materials, Inc. (AMT), the world's fourth largest maker, recently revealed its intention to establish a production plant in Japan to operate in 1983.

These moves correspond to similar steps taken by major U.S. semiconductor makers, including Texas Instruments Inc., Motorola Inc., Intel Corp., Fairchild Camera & Instrument Corp. and Advanced Micro Devices, Inc. These makers are now expanding production lines in Japan or conducting feasibility studies on eventually starting production in Japan. (Refer JEJ-Dec. 15 issue.)

In an interview with the Nihon Keizai Shimbun in Tokyo recently, James C. Morgan, president of AMT, said that his company will begin production in Japan in 1983. The Santa Clara (Calif.)-based company has been marketing a variety of semiconductor production equipment in Japan through its subsidiary, Applied Materials Japan Inc. Sales in 1981 are estimated at ¥3 billion. AMT hopes to double sales in Japan to ¥6 billion next year.

Earlier, GCA announced a plan to set up a semiconductor-making equipment manufacturing company in Japan jointly with trader Sumitomo Corp. The joint venture is expected to start production of silicon substrate processing equipment in the middle of next year. GCA, headquartered in Bedford, Mass., is the world's third largest maker. (Refer JEJ-Dec. 8 issue.)

Late last month, MRC announced that it will set up a production plant in Oita Pref. next spring. The plant is expected to start production of sputtering equipment in 1982. (Refer JEJ-Dec. 1 issue.)

Beside them, Tokyo Electron Ltd., a trading company specializing in electronic products, has teamed up with American companies to produce semiconductor production equipment in Japan. It set up in July TEL-Genrad Limited jointly with Genrad Semiconductor Test, Inc. of Milpitas, Calif. to produce semiconductor testing equipment. Construction of production plant is now under way. TEL also established this summer TEL-TRE Limited jointly with TRE Semiconductor Equipment Corp. of Woodland Hills, Calif. TEL-TRE is now building an exposure equipment manufacturing plant.

One of the major motivations of these American firms' active spread into Japan is the start of mass production of very large-scale integrated circuits (VLSIs) by Japanese semiconductor makers ahead of their American rivals. U.S. suppliers of equipment are trying to grab a large share on the strength of their highly sophisticated devices before the VLSI market becomes matured.

The enthusiasm of American semiconductor production equipment manufacturers about the Japanese market was evident at the SEMICON Japan '81 trade show held in Tokyo on December 2-4. The number of U.S. makers participated in the annual trade fair, sponsored by the Semiconductor Equipment and Materials Institute (SEMI) of the U.S., increased to 155 from last year's 130. Also, the U.S. industry sent a 14-member delegation to the fifth trade show, where the world's 417 companies exhibited their semiconductor equipment and materials. The team, headed by President Joseph Ross of Micro Mask, Inc., included Charles Drumd, president of Tylan Corp., Edward Dehring, president of CVC Products, Inc., Robert Lorenzen, president of Siltec Corp., and Frederick Van Veen, vice president of Teradyne, Inc.

Japanese semiconductor makers long have been dependent on American companies for supply of production facilities and equipment. Even at present, a half of production facilities operating at Japanese semiconductor production plants are made-in-USA products.

Recently, however, Japanese producers of equipment have been gaining strength and some of them make a frontal challenge against American producers. It now seems certain that the ratio of American-made and home-made semiconductor production equipment will be reversed in the near future. Moreover, Canon, Inc., a producer of exposure equipment, and some other makers have started exporting their products to the U.S.

Under the circumstances, American companies' local production will further intensify competition in Japan. Local production is expected to put American companies at more advantageous position than before as to prices, delivery and post-sales service.

As Japan's semiconductor industry has become a ¥1-trillion business this year and will further expand at a fast tempo in coming years, more American semiconductor production equipment makers will move into Japan.

Major U.S. Semiconductor Production Equipment Makers Planning to Locate Production Plants in Japan

GCA Corp.
[illegible]

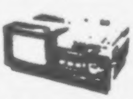
Materials Research Corp.
[illegible]

Applied Materials, Inc.
[illegible]

Genrad Semiconductor Test, Inc.
[illegible]

TRE Semiconductor Equipment Corp.
[illegible]

Funai exports novel VTR-TV to Technicolor



Funai Electric Trading Co., a Daito (Osaka)-based manufacturer of the CVC-format video tape recorders, has started shipments of a portable VTR-TV combination to Technicolor, Inc. of Los Angeles, Calif.

The single-unit portable VTR-TV, the first of its kind, is sold under the American company's brand in the U.S. market.

The model measures 457 millimeters wide, 420 deep and 226 high, and weighs about 9.5 kilograms. The built-in color TV has a 5-inch picture tube.

Technicolor now sells the single-unit model for $1,7[illegible]. Funai plans to introduce the model in the domestic market next summer.

Sharp will license semiconductor processing technology to Rockwell

Sharp Corp. will license its semiconductor processing technology to Rockwell International Corp. of the U.S. The two recently reached basic agreement on the deal. A formal contract will be signed early next year upon agreement on terms in detail.

Nearly 10 years ago, Rockwell was a "teacher" of Sharp as the Osaka-based consumer electronics maker learned the ABCs of how to produce semiconductors. This time, the Pittsburgh (Pa.)-based company introduces Sharp's highly sophisticated technique to produce complementary metal-oxide-semiconductor (CMOS) elements, which are power-saving integrated circuits indispensable in calculators and digital wristwatches. This indicates Japan's remarkable progress in the field of microelectronics during the past decade, industrymen said.

Major pillars of the planned licensing contract are:

—Sharp will provide all its CMOS processing techniques to Rockwell.

—Sharp will receive Rockwell's trainees and dispatch technology guidance teams to Rockwell, if necessary.

—Rockwell will produce CMOS to be sold under its own brand.

The technology concerned covers all production stages, ranging from designing of circuits to etching and ion implanting. Sharp's CMOS production technique reportedly is far superior to Rockwell's.

Sharp has been improving semiconductor production technology it introduced from the American firm. It has succeeded in developing more elaborate techniques than the American licenser's. Last year, Sharp scrapped its "second source" contract with Rockwell for microprocessors.

current will also be kept constant. Using these procedures, the windpower generator will be operated in conjunction with commercial power lines. In other countries this method has already been adopted.

Windmills used for windpower generation are generally of the lift type. The counteracting force type windmill, as represented by the windgauge (anemometer), which has arms supporting cup-like wind acceptors, can be used efficiently at low wind speeds but loses efficiency as wind speed increases. The lift type windmill utilizes wind energy on the same principle as an airplane's wings (greater speed produces greater lift), thus the efficiency of utilizing wind energy increases with wind velocity. Because wind energy is proportional to the cube of wind velocity, the lifting force type windmill is usually used for windpower generation in view of its efficiency.

In some windmills the rotor axis is parallel to wind direction and in others it is perpendicular. The Sunshine Plan's design employs a horizontal rotor axis and a lift type propeller.

Basic experiments on the propeller-type windmill wered performed at the Mechanical Engineering Laboratory using a 1/25 scale model for wind tunnel tests. The number of blades is usually two or three, and the test windmill used two. The use of three blades greatly increases cost while raising efficiency only a few percent and a two-blade propeller is safer considering the high frequency of typhoons in Japan. When wind velocity exceeds a definite value (high wind condition), the blades change their direction to the horizontal in relation to the ground, and adjust their angle to minimize wind resistance. When using three blades, it is impossible to hold all three blades horizontally, thus increasing wind resistance, requiring greater mechanical strength, and causing safety problems in the event of a typhoon.

The windmill begins to rotate when wind velocity reaches 5m/s, attains the rated output at 10m/s, and stops rotating at speeds above 17m/s, for safety. To avoid variations in alternating current frequency due to changes in wind velocity, it rotates at a constant speed of 51rpm by controlling the pitch angle of the blades using a microcomputer. The pitch angle is hydraulically controlled.

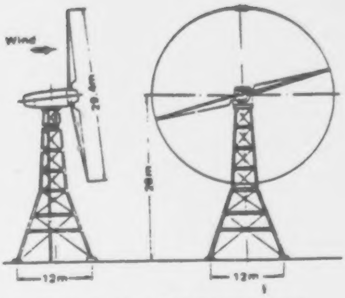


Fig. 1. Profile of 100kW Pilot Windmill

As shown in Figure 1, the diameter of the propeller is 29.4m, and the height of the propeller axis is 28m. The material of the blades is GFRP. The rotational speed of the rotor, 51rpm, is changed up to 1,500rpm by a multiplier to drive the generator, which is a DC link system. Using pitch angle control and frequency control to adjust input to the DC link system, it is possible to supply stable electric power independent of wind velocity variations, to the electric power network. Miyakejima is the proposed site. If this pilot windmill is successful, the plan is to construct an experimental windmill having a capacity of 1,000kW.

Competition Around VLSI's

Hitachi, Ltd. announced on December 17, 1981 that it would begin sale of 256K-bit RAM VLSI's as samples to about 100 user companies from autumn, this year. Thus, these new units are expected to put into commercial application by the spring of 1983. The production rate will increase from a volume of tens of thousands in early 1983 to hundreds of thousands by the end of 1983.

As a result of the announcement by Hitachi, 256K VLSI's will appear on the market three years earlier than expected, and competition among the makers will suddenly intensify.

When 64K RAM's were first sold as samples in the autumn of 1980, the price of one unit was ¥20,000, but after only one year, it sharply dropped to ¥2,000. At present, the price is about ¥1,200 but it is expected to drop to ¥1,000 before long. Usually the price of IC's follows the "Learning Curve" theory proposed by the Boston Consulting Group of the U.S. which states that price drops 30% with a two-times increase in production. Therefore, a high-production maker can decrease the cost per unit, and increase his profit, thereby gaining a greater market share. The higher market share in turn leads to increased production and even more favorable conditions. These are the practical conclusions of the "Learning Curve."

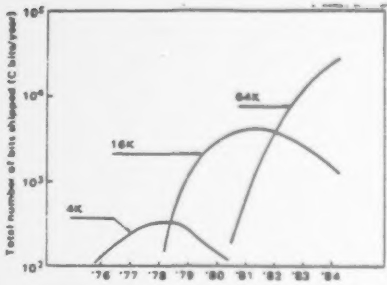


Fig. Number of Bits Integrated of Dynamic RAM's (W/W)

Table. IC Sales, R&D Expenses and Equipment Investment

Fiscal year	IC sales (A) (million yen)	Compared with previous year	R & D expenses (B) (million yen)	Compared with previous year	B/A (%)	Equipment investment (C) (million yen)	Compared with previous year	C/A (%)
1973	96,223	–	17,030	–	18.7	18,074	–	21.0
1974	83,484	86.7	18,520	108.8	22.2	17,505	93.2	21.2
1975	100,150	120.7	21,534	116.1	19.9	11,270	64.7	10.5
1976	164,024	163.5	24,267	112.9	14.7	35,191	300.3	21.3
1977	160,474	94.3	24,456	100.7	15.7	21,950	62.4	14.1
1978	251,881	163.0	37,987	155.4	15.1	40,038	200.3	16.2
1979	374,910	148.8	54,774	144.2	14.6	84,103	163.1	22.4
1980	547,100	146.1	66,827	120.0	12.6	138,875	162.7	24.0
1981	654,207	110.5	87,186	130.3	13.3	165,404	130.6	25.3
1982 (Planned)	827,300	126.5	112,603	129.1	13.6	216,510	130.0	26.2

Source: 1982 Electronic Industry Yearbook

The fact that Japanese semiconductor makers have become believers in this theory has triggered confusion in the 64K RAM market and created friction between Japan and the U.S.

When the technical considerations for marketing 64K RAM's were satisfied, Japanese makers began intensive efforts to expand production independent of actual demand. In the semiconductor industry it is generally considered that important new products are introduced about every four years. The market for 16K RAM's has continued for four years, and the greater share was held by the American semiconductor industry. When the age of 64K RAM's arrived, all the big makers of semiconductors in Japan announced that they would be suppliers of the product. Mitsubishi Electric Corp., the latecomer in the 16K RAM market, joined the group. Oki Electric Industry Co., which had no positive achievements, announced it would supply 64K RAM's. Oki Electric was followed by Sharp Corp. in April last year. All these makers are carrying out their plans. It is natural that prices will drop with the increase of production, independent of real demand.

If the price of 64K RAM's drops to ¥1,000 per unit, the price will become comparable to that of 16K RAM's. Then, the users will naturally select 64K RAM's instead of 16K RAM's because of the better cost/performance ratio of the former. Thus, the demand for 64K RAM's has grown rapidly. As a result, 64K RAM's are now replacing 16K RAM's in Japan, and further, demand for them has been greatly expanded abroad. According to one view, over half the demand in the world is supplied by Japan. It is believed that 8 to 10 million 64K RAM's were manufactured in 1981, and over 60 million will be manufactured in the world this year. And the price per unit is approaching to about two-thirds of that of a 16K RAM. This situation is one reason for the friction concerning semiconductors between Japan and the U.S. Although the growth in demand for 16K RAM's has stopped, its production has not diminished.

The price of 64K RAM's has fallen more rapidly than was expected, so makers have not been able to gain the profits they had hoped for. A top manager in the field says that the expected profit of about ¥5 billion did not materialize. Despite the previous bright outlook, extremely hard competition in the VLSI field has put companies in a very severe situation.

It was generally believed that the market for 64K RAM's would continue for three more years, but competitive sales have just begun and every maker is trying to expand production rapidly. NEC, Hitachi and Fujitsu are aiming at reaching a production scale of one million units per month by this spring, and Oki has announced that its production of 400 thousand units in December last year will be increased to 800 thousand in March. Mitsubishi Electric is planning to production 500 thousand units this spring. Toshiba reportedly will expand production equipment to raise the present monthly production of 100 thousand units to 1 million units by the end of this year. Sharp will begin production of 300 thousand units per month from April.

This expansion of production by Japanese makers is to be attained by investing 41% of their sales. Shown in Table 1 are the trends of IC sales, research and development, and investment in equipment. In 1982, research and development expenses and equipment investment are expected to amount to 13.6% and 26.2%, respectively, of sales – a total investment of 29.8%. This fact shows that the IC industry is really investment-oriented. It is feared that these active investments might result in intensified competition and excessive equipment.

With demand for 64K RAM's at the end of this year expected to exceed supply, the market is still expanding. Japanese makers have enjoyed development benefits in the new 64K RAM market. So long as the 16K RAM market in the U.S. has not diminished, Japanese makers are not infringing on the acquired market.

It may be said that Japanese makers have established a basis for existence by obtaining a greater share of the expanding market. Here is the essence of the friction in the Japan-U.S. semiconductor war.

When the market stops expanding, some makers may not be able to afford such a high rate of investment. This is reflected in the small number of enterprises, which have gone into production of 65K RAM's, compared with 16K RAM makers the worldover.

Under these circumstances, the industry was shocked when Hitachi announced on December 17 of last year that it would begin mass-production of 256K RAM's from the autumn of 1982. Now both Japanese and American makers will have to go all out in investing in production of 256K RAM's despite the fact they have not recovered their 64K RAM investment.

While the appearance of 256K RAM's will intensify the friction between Japanese and U.S. semiconductor makers, but users will benefit by the acceleration of technological developments in the electronics field.

AY, JANUARY 12, 1982 THE JAPAN ECONOMIC JOURNAL 9

oshiba freezes original plan mass produce 64K RAM chips

d the intensifying com- n among Japanese semi- tor manufacturers to their production capacity y large-scale integrated ts (VLSIs), Toshiba currently the third larg- ucer here has frozen an to mass produce 64- random access memory chips. Instead of in- ng its capacity of 64K from its current monthly of 100,000-some units to) units in next March as it arlier planned, Toshiba rocure a certain percen- f the chips to be used in all computer lines from n Electric Co., the top

e settlement of detailed tions now underway be- Toshiba and NEC, the will probably start sup- Toshiba 64K RAMs be- g next month at the ear- nitially by around 20,000 on a spot basis.

hiba's planned procure- of 64K RAM chips reflects siderable change in its m-range strategy toward semiconductor business, ould affect future market among the manufacturers, both on a worldwide scale, industrial sources here believe.

Mass production of 64K RAMs, the first-generation product of VLSIs, began only last year. Success in this field is believed to be indispensable for manufacturers to survive in the future and as a step up to the second generation, 256-kilobit RAMs. Hitachi, Ltd. announced last December it would begin mass production as early as next autumn of 256K RAMs, which have a four times larger memory capacity than the 64K.

In a bid to secure as large a share as possible of the market and to benefit from large scale production, Japanese manufacturers have started increasing their production capacity one after another. By the end of next March, NEC expects to be turning out 1.05 million chips monthly, while Hitachi and Mitsubishi Electric Corp. anticipate monthly production of 1 million and 300,000 chips, respectively. A year ago, the production rate of each of these companies was only several tens of thousands a month.

It is believed that Toshiba's failure in startup marketing competition of 64K RAMs is behind the decision to freeze its plan calling for increased capital spending. Toshiba and NEC have a joint "computer sales/software development business under Ministry of International Trade & Industry guidance.

"This does not mean we are withdrawing from the VLSI field. We are developing more competitive, special types of 64K RAMs and other VLSIs, which we could start marketing this autumn," a top executive of Toshiba said.

rsu will match ers in raising production

itsu Ltd. will raise its pro- on capacity of 64-kilobit om access memories As) to 1 million units a h in next March, it was ed last week. Fujitsu be- the third semiconductor er here to reveal the plan oducing 1 million 64K RAM following Hitachi, Ltd. Nippon Electric Co.

M Japan is ing to use al equipment

M Japan Ltd. is consider- a plan to install Japanese e production facilities in very large-scale integrated uits (VLSIs) plant it is ding at Yasu, Shiga Pref., Kyoto, instead of import- from the U.S. parent its VLSI manufacturing pment, industrial sources had earlier anticipated.

M Japan has already en- d procurement negotiations several Japanese com- es including JEOL, Ltd., a er of electron beam ex- re devices, according to of- als of IBM Japan.

aking semiconductors ising the U.S. parent's ology coupled with Japa- e management techniques h as the quality control cles" was believed to be I Japan's basic policy. The ent change in policy (of curing Japanese equip- t) and moves made by er American semiconductor ufacturers, including a ge lot procurement of Japa- e equipment for a Texas In- ment subsidiary plant here, cate increasing acceptance high evaluation by U.S. npanies of Japanese tech- ogy in this field.

ELECTRICALS & ELECTRONICS

Uniform standards for new VTR system will be sought

An industrial council will be formed in Tokyo, possibly within this month, to set unified standards for a new video tape recorder system. Four electronics makers — Sony Corp., Hitachi, Ltd., Matsushita Electric Industrial Co. and Sanyo Electric Co. — revealed in 1980 and 1981 experimental models of the next generation VTRs, which combine a small video camera and a recorder in a single unit, utilizing some 8 millimeter cassette tape.

Although having a virtually identical basic concept, each system developed by the four differs in detail, and no tapes among them are compatible. In order to avoid further confusion and inconvenience among consumers who already are suffering from different formats of the current VTRs, the Ministry of International Trade & Industry initiated negotiations among the would-be manufacturers of the new system a few months ago and a series of preliminary talks have been held.

Certain standard specifications are expected to be worked out before marketing starts within a year or two by the new council, scheduled to be composed by about 13 Japanese electronics, camera and VTR tape makers. It will include Philips of the Netherlands and possibly some U.S. concerns, sources said.

MITI now feels that the uniform standards will become close to Matsushita's "Micro Video" system, which incorporates a 7-millimeter metal evaporated tape packed in a cassette measuring 94 x 63 x 14 millimeters.

TH

Only few U.S. makers take part in NTT procurement biddings

More than a year has passed since Japan agreed with the United States in December, 1980 to open procurement of Nippon Telegraph and Telephone Public Corp. equipment to international bidding. NTT has kept its word during this period and, upon President Hisashi Shinto's stern instructions, implemented its three-track procurement procedures, thereby opening up its market more speedily than scheduled.

But the U.S. Government and Congress, frustrated over the country's $18 billion trade deficit with Japan, still complain that NTT's open door policy is not sufficient. Their frustration is illustrated by the proposed amendment to the communications act, pending in Congress, to exclude foreign firms from the U.S. communications equipment market.

The items NTT has opened to international bidding have reached 90 since the agreement with the U.S. took effect. Of these, 81 are categorized for "Track I" which applies to general equipment and are procured through competitive bidding. One item is classified for "Track II" which applies to mainline communications equipment already available in the market and utilized by NTT with some modifications. The remaining eight items are for "Track III" which is applied to buy parts of mainline communications equipment and calls for joint research by NTT and private firms for eventual NTT use.

In the "Track I" category, bidding has been completed for 28 items out of the 81 totaling ¥7.4 billion in value, and distributed among 41 firms. Nine foreign firms have won tenders for eight items, including research equipment totaling ¥770 million: they are seven American and one Dutch firms.

So far, 22 firms have applied to participate in bidding for nine items under "Track II" and "Track III" in which only one foreign firm, Motorola Inc. of the U.S., took part in a bidding for automobile telephone equipment. NTT's expectations that more foreign firms will take part in biddings have, up until now, not come true.

Thus, the fact remains that contrary to NTT's expectations, foreign firms do not appear very eager to participate in the biddings. But this does not mean that they are not interested. During the past year, about 260 inquiries have been made to NTT from foreign firms and governments about procurement procedures. But when it comes to actual biddings, there are many cases that foreign firms' general equipment under "Track I" does not meet specifications of NTT.

NTT's Procurement from Foreign Firms

Item	Company name
[illegible]	[illegible]
Low pressure CVD	[illegible]
Graphic Design System (1)	CALMA Co.
Graphic Design System (2)	Applicon Inc.
[illegible]	The Perkin-Elmer Corp.
Computer system	[illegible]
[illegible]	Philips
[illegible]	Varian Associates, Inc.

For example, Hewlett-Packard Co. of the U.S. was very eager to sell its measuring equipment but did not participate in a bidding because the company's product did not match NTT specifications. Hewlett-Packard uses "inch"-unit screws for its products, whereas NTT specifications call for "millimeter"-unit products. On the surface, the difference between "inch" and "millimeter" does not matter much, but it can make a supplier to give up participation in a tender, as actually happened.

Secondly, when it comes to the procurement of mainline communications equipment under "Track II" and "Track III," the international standard becomes a moot point. NTT procures products which follow closely the standard set up by the Consultative Committee for International Telephone and Telegraph (CCITT), but U.S. firms, like Western Electric, do not care much about such standard. Consequently, products of foreign firms do not get into even procurement biddings.

NTT officials said these U.S. firms are somewhat arrogant in their reasoning that since their products are well accepted in the U.S., NTT should accept them according to U.S. standards. An increasing number of foreign firms have visited the NTT head office in Tokyo to sell their products, but President Shinto told them, "If you like to sell to NTT, you should change your products suited to specifications of NTT. Without such efforts, you just cannot blame us for not opening up our market enough."

On the other hand, a spokesman for NTT said, "The problem of specifications will be resolved with time. But since this is a competitive bidding, we cannot buy products if the prices are too high. That is, when foreign firms cannot win biddings because of their high prices, the problem will be more complicated than before."

NTT is planning to list more products for international biddings and have all their equipment placed under such bidding by December, 1982. But even after their products are open to free competition, NTT will suffer from fresh problems in case foreign firms will fail in one bidding after another because of high prices. Unless the fundamental issue of trade frictions with the U.S. and Europe are solved, the NTT procurement issue will always be vulnerable to attacks from abroad.

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Facsimile prod. will climb 25% yearly

Japan's Facsimile Production Estimated by the Communications Industries Association of Japan

(In ¥ billion)

	Fiscal 1980	FY'81	FY'82	FY'83	FY'84	FY'85	Average annual growth FY'80-85 (%)
High-speed type	[illegible]	80.0	[illegible]	[illegible]	121.0	140.0	27.0
Medium-speed type	[illegible]	[illegible]	[illegible]	60.0	[illegible]	85.0	[illegible]
Low-speed type (*1)	0.9	1.3	[illegible]	8.0	[illegible]	12.9	[illegible]
Others (*2)	[illegible]	6.0	7.0	9.0	10.0	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(*1) [illegible] Minifax. (*2) such as for governmental offices and [illegible]

Japan's facsimile equipment production will keep growing at an average annual rate of 25 per cent in the next five years from the current fiscal year, ending next March, to reach ¥257,900 million in fiscal 1985, according to a recent forecast by the Communications Industries Association of Japan. The estimated figure for 1985 is roughly three times larger than the actual production in fiscal 1980.

Among various kinds of equipment, the high-speed type, capable of sending a sheet of A4 size (30 x 21 centimeters) of paper within 1 minute, will increase at an average annual growth rate of 27 per cent during the five-year period, and will reach ¥140 billion in fiscal 1985, while the medium-speed type (3 minutes) will grow by 19.8 per cent per annum to ¥85 billion, the association predicts.

Especially amazing is growth rate in the low-speed type requiring 6 minutes to send a sheet, which is expected to soar by 69.2 per cent annually to ¥12.9 billion in fiscal 1985. This is because the association included the "Minifax" equipment of the Nippon Telegraph & Telephone Public Corp in the category of the low-speed type.

Minifax can send in 1½ minutes a sheet of paper, though in smaller A5 size (21 x 15 centimeters).

As soon as NTT started the Minifax service last September at a relatively cheap leasing charge, orders rushed into NTT. The public corporation has a huge back log of orders at the moment. Total orders for Minifax in the first half-year period of its marketing are expected to surpass 20,000 sets.

The low-speed type earlier had started to lose momentum with the introduction of new, high-speed types of facsimile equipment.

ELECTRICALS & ELECTRONICS

Toshiba is due to double output of 16K static RAM

In a bid to carry on a rollback in the intensifying struggle on the very large-scale integrated circuits (VLSI) market, Toshiba Corp. is going to put the strongest emphasis on the 16-kilobit static random access memory (RAM) chips.

Although lagging in marketing race of 64K RAMs, where the battle among the semiconductor producers is the most intensive now, Toshiba is currently the top maker of 16K static-type RAMs, integration of which is equivalent to that of conventional 64K RAMs of the dynamic type.

Static chips retain memories as far long power is on, while put-in memories of dynamic chips vanish after a certain period of time. Peripheral circuits also are simpler for static than for dynamics, it is said.

Toshiba now is making 300,000 16K static RAMs a month at its Oita works in Kyushu island and is planning to double their capacity after April. The current production capacity represents 50 per cent of the world market for that type of memory chip, a company spokesman said.

In the field of 64K dynamic RAMs, Toshiba now produces less than 100,000 chips monthly, compared with nearly 1 million units for both Hitachi, Ltd. and Nippon Electric Co. Toshiba earlier froze its plan of mass-producing next generation VLSI — 256K dynamic RAMs (JEJ January 12, 1982, issue) — and instead, has chosen 16K static RAMs as its strategic products.

The Tokyo electronics company will also start making 64K static RAMs, which it has already developed, at a rate of 50,000-60,000 units a month during the second half of this year.

Sanyo is going to market VHS type VTRs in Europe

Sanyo Electric Co. plans to start marketing its video tape recorders employing the Video Home System (VHS) in Europe from as early as next spring.

Sanyo Electric originally was a member of Beta-Format camp in VTR marketing race and was selling only Beta VTRs. The Osaka company, however, started producing also the VHS models at its subsidiary Tokyo Sanyo Electric Co. from last September to increase its market share.

Producers of Beta-Format equipment have lost momentum, other than their leader Sony Corp., while the VHS manufacturers, led by Matsushita Electric Industrial Co. and Victor Co. of Japan, Ltd., have swept the world market as of the first half of last year.

Sanyo already delivers its VHS equipment in the U.S. through its American subsidiary, Fisher Corp. of Los Angeles. In Europe, Sanyo's VHS VTRs will be distributed by Fisher Hifi Europa Vertriebs-GmbH of Munich, a Fisher Corp. unit, under Fisher brand name as in the U.S. Marketing will be initially aimed at West Germany.

To cope with increasing exports, Tokyo Sanyo Electric is to raise its production capacity of VHS VTRs to 40,000 units a month in April from 13,000 units at the end of December.

The Sanyo group last year turned out 570,000 VTRs, mostly Beta-Format, up 107 per cent over 1980. It expects that the increasing demands for VHS will greatly help the group to boost the total VTR production in 1982 to at least 1.85 million units, up 233 per cent over 1981.

Meanwhile, Minolta Camera Co. last week disclosed that it plans to market VHS videos to be produced by Hitachi, Ltd. on an original equipment manufacturer basis. The camera and optical equipment maker plans to start marketing of VTRs within this year.

Mitsubishi will use GaAr for discrete semiconductor

Mitsubishi Electric Corp. is going to start applying in the next two or three years gallium arsenide, instead of conventional silicon, to mass production of discrete types of semiconductor.

Development of all sorts of gallium arsenide (GaAr) currently is being studied by semiconductor makers because GaAr is a potentially evolutionary semiconductor material along with the Josephson element and high electron movement transistor (HEMT).

GaAr promises far greater speed of information transmission than silicon, a correspondingly higher computing speed and higher frequency, and far greater resistance to shock.

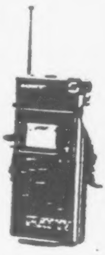
Thus, it will be ideal for making semiconductors for automobiles, factory machinery and also parts of fiber optics communication lines.

The corporation said it already has completed its own type of GaAr at the laboratory level for applying to volume production of discrete types of semiconductor which are finding increasing demands for making sensors and numerous other electronic devices.

Sony turns out pocket TV only 3.3 cm in thickness

Sony Corp. last week announced that it will soon market in Japan a miniature black-and-white television receiver.

The FD-200, dubbed "Flat TV," measures 8.7 centimeters wide, 19.8 centimeters high, and 3.3 centimeters thick, and weighs 540 grams. With DC 6V power source — either of dry-cell batteries, an optional rechargeable battery, household power, or a car battery — it can receive both VHF and UHF stations.



A new cathode ray tube, FD Tube (Flat Display Tube), is the key factor enabling the size reduction, according to the Tokyo company. In the FD Tube, the electron gun is positioned parallel with the phosphor screen. The electron beam from the gun is deflected by the deflection plates to the screen. This parallel position made the 1.6-centimeter thick tube's flat shape possible.

A miniaturized flyback transformer, a high voltage circuit usually occupying considerable space in a TV, and extensive use of integrated circuits also helped in working out the unique pocket TV, Sony said.

FD-200 will be marketed for ¥54,800 on the domestic market from late February. Sony plans to introduce the pocket TV to the U.S. market within this year.

Domestic shipment of audio equipm't records decline after four years

Domestic shipment of audio equipment in 1981 declined from the preceding year for the first time in four years. Electric appliances industry here is shocked by the fall of domestic demand, especially when they already are confronted with sluggish demand in such major exporting markets as the U.S. and West Europe.

In 1981, Japanese manufacturers shipped to the home market ¥717.5-billion worth of audio equipment, including radio and car stereo sets, down some 3 per cent from 1980, according to a recent estimate. A drop in system component type stereo sets — the major cash earners for the industry — was especially conspicuous, totaling ¥90 billion, or 20 per cent smaller than the preceding year, it said. Among other types of products, tape deck and deck/receiver registered year-to-year declines.

Saturation in Japanese homes of stereo sets is believed to be contributing to the slump. New demands for portable stereo cassette players and mini component systems are not big enough to compensate for the drop in bigger, more expensive products, analysts say.

Industrymen currently expect only around a 3 per cent increase in domestic demand in 1982.

To cope with the current slump, especially to clear inventory in their overseas sales areas, some producers already have started production cuts. Pioneer Electronic Corp. is curtailing 20 per cent of its production capacity for three month from January. Trio-Kenwood Corp. also will idle 20 per cent of its production line from next March.

Pioneer Ansafone sells products to Swedish firm

Pioneer Ansafone Mfg. Corp., an answering machine producer wholly-owned by Pioneer Electronic Corp., made a successful bid to supply a Swedish telephone company with such devices, the company recently disclosed.

Pioneer Ansafone will start shipping the machines to Swedish Telecommunications Administration of Stockholm from November, through Tokyo trader Gadelius K.K. which is wholly-owned by Gadelius & Co. AB of Sweden.

The answering machine producer expects a demand of about 10,000 units a year from the Swedish corporation will continue for the next four to five years.

More than 10 producers from Japan, the U.S. and Europe are reported to have participated in the bidding to decide a supplier to succeed a West German maker which so far has been a contractor of the Stockholm telephone firm.

With 8.3 million population and 6.4 million telephones, Sweden has the second most telephones per capita after the U.S.

NTT streamlines procurement setup

Nippon Telegraph and Telephone Public Corporation (NTT) announced that the company has newly established the International Procurement Division within the Supply Bureau. The Procurement Policy Division, which had been set up within the company to deal with negotiations with foreign governments over procurement policies, will officially close on February 9, 1982.

The new division has been specifically set up to streamline NTT procurement procedures for both domestic and overseas suppliers.

4 17

oshiba plans to make -megabit RAM in '84

Toshiba Corp is planning to itiate commercial production the so-called 1-megabit RAM andom access memory ips as early as late 1984, far ead of other semiconductor anufacturers anywhere 1M AMs can store on a tiny icon substrate several millieters square more than 1 milon information, or 16 times ore than those in the current most sophisticated 64K RAM ips.

The Tokyo electronics comany will start constructing ext August an "experimental-evelopmental plant for VLSI very-large scale integration)" t the projected cost of ¥20 bilon in Kanagawa Prefecture, outhwest of Tokyo. It plans to ake experimental 1M RAMs ometime in the summer of 83.

Toshiba's aggressive plan is egarded as its rollback straegy in the VLSI field. Toshiba as been lagging behind its rch rivals Hitachi Ltd., Fujitsu Ltd. and Nippon Electric Co. (NEC) in mass production of 64K RAMs, the first generation of VLSIs, of which the marketing competition started only last year. Fierce price competition in 64K RAMs forced Toshiba recently to drop its original plan to raise its monthly production of 64K RAMs from the present 100,000 units. Hitachi, NEC and Fujitsu plan to boost their capacity to around 1 million units a month in next March.

Hitachi, meantime, announced it will mass produce 256-kilobit RAMs this autumn. Toshiba is regarded to be attempting to survive the VLSI race by taking the initiative in the even more highly integrated 1M RAMs.

The U.S. Department of Defense is reported as already started development effort for the 1M RAMs, but Toshiba will be the first private concern anywhere to conduct such an activity on its own.

Hitachi eyes 2nd plant in America to produce VLSIs

Hitachi Ltd. is planning to start construction within this year a second plant in the U.S. to mass produce very large scale integrations (VLSIs), it was learned recently. The envisaged U.S. plant, details of which still are undecided, will have integrated manufacturing lines for 64-kilobit random access memory (RAM) chips. The Tokyo electronics giant's production subsidiary in Dallas, Texas, now assembles major components imported from Japan for memory chips, mostly 16K RAMs.

Hitachi's plan to set up more production facilities for VLSIs in the U.S. seems aimed at forestalling a fresh Japan-U.S. trade friction on semiconductors that now seems to be rekindling in the U.S. industry and Congress.

Japanese manufacturers, including Hitachi, Fujitsu Ltd. and Nippon Electric Co. (NEC), are already taking leadership in the market for 64Ks. Japanese-made 64Ks are said to be enjoying 70 per cent share of the American market for the first generation VLSIs. These manufacturers are planning to boost production capacities in Japan to as much as some 1 million chips a month around next March.

Faced with the aggressive strategies of such Japanese firms, some of the U.S. competitors eventually have been forced to withdraw from the market. Only the two giants — Texas Instruments Inc. and Motorola, Inc. — will be equally competitive with the Japanese in the coming years, some industry observers say.

So-called "reciprocity" legislation now regarded likely to be enacted in the U.S. Congress is aimed, among others, at the Japanese semiconductor industry, it is widely believed. Testifying last week at a public hearing in the Congress, Secretary of Commerce Malcolm Baldrige charged that the Japanese semiconductor producers are sharply increasing exports to the U.S., while protecting themselves by non-tariff barriers, and helped by governmental assistance on research and development. His accusation is in line with recent criticisms by the U.S. Semiconductor Industry Association, and micro chips appear likely to become a new source of trade friction between Japan and the U.S.

Tariffs on ICs in the U.S. were lowered from last year's 5.6 per cent to 4.24 per cent in January, and also in Japan will be slashed from 10.1 per cent to 4.20 per cent next April. Prolonged recession caused slowdown of Japan's IC exports; its IC trade surplus vis-a-vis the U.S. in the first 11 months of 1981 narrowed to ¥300 million from ¥3,400 million a year earlier.

However, more Japanese manufacturers, on their part, will have to follow Hitachi in "transferring" production lines from Japan to the U.S., in order to alleviate possible friction over semiconductors, analysts here predict.

"We sincerely hope that our colleagues in the American industry will succeed in a rollback of 64Ks," says Atsuyoshi Ouchi, senior vice president of NEC.

JVC sets up cassette plant in W. Germany

Victor Company of Japan (JVC) announced that it will establish a wholly-owned subsidiary in West Germany to assemble video cassettes.

The subsidiary, JVC Magnetape GmbH, will be located in Moenchengladbach, 30 kilometers west of Duesseldorf. It will start operation in the spring of 1983 with an initial annual production of some 3 million cassettes.

It will be the first Japanese-owned video cassette manufacturing plant in Europe.

Matsushita will offer lithium cells to Kodak

Matsushita Battery Industrial Co., a subsidiary of Matsushita Electric Industrial Co., announced last week that the company's 2/3A-size cylinder type lithium battery will be employed in the Eastman Kodak's recently announced disc camera.

The Kodak disc camera features ultra-thin and compact design using a unique rotary disc film and also features fully automatic film advance, exposure control and electronic flash systems.

The Matsushita lithium battery employs poly-carbon monofluoride for the positive electrode, lithium for the negative electrode, and an organic solvent of lithium salt as the electrolyte. It has nominal voltage of 3.0 V (twice that of ordinary batteries), five to 10 times larger capacity than ordinary manganese batteries, and flat discharge characteristics, according to the Osaka battery producer.

It can power the camera for 2,000 exposures, Matsushita said.

Matsushita Battery is going to supply 20 million — 30 million such batteries a year to Kodak for the use in the disc camera, marketing scheduled to start in May.

ITT obtains type certification for telephone set

International Telephone and Telegraph Corp.'s Tokyo subsidiary, ITT Asia Pacific, Inc., last week said that one of its telephone sets has received a type certificate for Japan's user-connect market from Nippon Telegraph and Telephone Public Corp.

ITT became the first non-Japanese manufacturer to obtain such certification from the governmental monopoly for an user-connect telephone set.

The telephone set, manufactured by ITT's Spanish subsidiary, Compania Internacional de Telecomunicacion Y Electronica, SA, and tradenamed "Gondola," is an out-pulse dialing set with re-dialing function, ITT Asia Pacific said.

ITT Asia Pacific plans to start marketing of the telephone set around next April.

ELECTRICALS & ELECTRONICS

Pioneer takes over video disc business from DiscoVision

Pioneer Electronic Corp. will become the leading supplier to world market of optical, laser pickup format video disc players and such discs.

Pioneer and its American partners in the video disc venture, MCA Inc. and International Business Machines Corp., have agreed on the latters' withdrawal from their equally-owned Tokyo company of Universal Pioneer Corp. (UPC). Pioneer thus will become the sole owner of UPC, which will assume rights to manufacture and market the optical video discs and players both for consumer and industrial markets worldwide.

UPC's right for such activities, including the technical patent rights, are to be obtained through DiscoVision Associates, the joint venture between MCA and IBM. Established in 1979, DiscoVision so far has produced the discs and players for the U.S. market but will now become merely a patent handling firm.

Pioneer is not going to buy major physical assets of DiscoVision, but the Tokyo company will obtain the master tape manufacturing facility at the Costa Mesa, Calif., plant of DiscoVision, according to the agreement.

No price for Pioneer's acquisition of the 50-per cent share in UPC was revealed, but UPC is capitalized at ¥5.9 billion at par.

The low yield to turn out high-quality discs at DiscoVision's production lines led MCA and IBM to decide on selling the disk operations to Pioneer and UPC, informants said. While nine out of 10 discs produced in UPC's Kofu, Yamanashi Pref., plant could meet the quality inspections for marketing, 30 per cent of the discs turned out at DiscoVision's Carson, Texas, plant reportedly fail to pass such tests, making the operations more costly.

Faced with such difficulties in quality control, DiscoVision earlier asked UPC to supply discs for the American market. UPC now ships some 30 per cent of its monthly output of 250,000 discs to DiscoVision.

The latest decision by MCA and IBM to virtually abandon their disc venture is believed to have stemmed also from the slower-than-expected development of the video disc market, in which manufacturers are expected to suffer from steady losses at least for the time being. Besides the optical discs, CED (Capacitance Electronic Disc) format video discs developed by RCA Corp. also are proving unpopular in the U.S. RCA sold last year 65,000 players, far lower than the targeted 200,000 units, the company earlier announced.

Industrymen here are equally shocked and puzzled by Pioneer's decision to shoulder a video disc venture in the U.S. and elsewhere at a time when the future of Japanese disc market still is unknown. Pioneer started marketing home disc players and discs last October, but the sales still are slow. Victor Company of Japan (JVC) and Matsushita Electric Industrial Co., the leaders in the VHD (Video High-Density) video disc camp along with General Electric Co. of the U.S. and Thorn EMI Ltd. of Britain, are to start marketing of their products, incompatible with either the optical or CED formats, during the first half of this year.

Even President Toshihiko Yamashita of Matsushita Electric Industrial is not optimistic about the disc market situation near future.

"It will take considerable years for video discs to become a popular consumer electronic products. No brisk business can be expected in discs in the immediate future," he says.

Some observers here worry that the disc venture be another burden on Pioneer, which already is suffering from a slump in its traditional audio equipment lines. The others, however, say that Pioneer will be able to benefit from the integrated marketing strategy worldwide it now can plan totally on its own.

Only Pioneer itself is confident about its future disc business.

"We know we are going to face serious problems for a while. But the time is not far for us to enjoy prosperous markets in the disc venture," says Yuzo Ishizuka, Pioneer president.

Makers of CED format disc players cut production

With the slow popularity of video disc systems in the U.S., Japanese manufacturers of CED (Capacitance Electronic Disc) format disc players are being forced to cut their production capacities for the American market.

Sales of CED format video discs were started in the U.S. last March by the developer RCA Corp. Japanese companies which joined the CED camp, Hitachi Ltd. and Toshiba Corp., began producing the disc players in May, last year, and started marketing in the U.S. in June. Along with selling under their own brand names, Hitachi and Toshiba are shipping their disc players to big American retailers, including Sears, Roebuck, on an original equipment manufacturer basis.

Although the two companies initially envisaged 20,000-unit-a-month production by the autumn, last year, they currently are turning out only around 2,000-3,000 units a month.

Sanyo Electric Co., which followed Hitachi and Toshiba last November, eventually suspended production of the CED disc players after its first shipment of only 6,000 units.

The stagnant sales of the CED system is ascribed, among others, to the narrow range of disc titles, which center on movies and directly compete with cable TV programs, and dulling personal consumption expenditures due to the prolonged recession in the U.S.

The slow sales recently led to a price cut race among the producers and retailers. A player price listed at $499 in some cases are sold for $280-$300, it has been reported.

Japanese manufacturers are now hoping that the new type of the CED player to be put on the market by RCA next spring, capable of playing back pictures with stereo sound, will stimulate buyers. The present CED players are capable of only monaural sound playback. Views are increasingly becoming dominant among the producers here, however, that an early pickup in disc player sales is not likely.

TH

Hitachi will give Hewlett-Packard 64K dynamic RAM technology

Hitachi Ltd. and Hewlett-Packard Co. (HP) have reached technical cooperation agreement under which the Palo Alto, Calif. company will produce 64-kilobit dynamic random access memory (RAM) chips with the Tokyo electronics maker's technique.

This is the first case for a Japanese semiconductor manufacturer to tie up with a foreign company in 64K dynamic RAM technology. The Hitachi-HP cooperation is expected to help ease the reviving trade friction on integrated circuits (ICs) between Japan and the U.S. as Japanese-made 64Ks are regarded to have aroused the current criticisms among the U.S. semiconductor industry against their Japanese counterpart. The 64Ks, dubbed the first generation products of very-large scale integration (VLSI) memory chips, shipped from Japan now account for 70 per cent of the total 64Ks being sold on the American market.

The latest accord stemmed from HP's request made last summer to Hitachi of technical aid. A major user of memory chips for employment in its computer and other electrical equipment lines, HP has experience with the high quality Japanese semiconductors and highly evaluates them, sources said. Hitachi, on its part, has been providing HP with a lots of semiconductors. The fact that the Tokyo firm is active in technological ties with the other companies on cross-licensing bases also led to HP to select Hitachi as its prospective partner, according to analysts.

Upon signing the agreement, scheduled within March, HP is going to mass manufacture 64RAMs at its Cupertino, Calif. plant, utilizing Hitachi technologies including the N-channel MOS (metal oxide semiconductor) and mask aligning techniques. HP is to incorporate the 64Ks in its mini computers and measuring equipment, and will not market them to outside users, Hitachi said.

Hitachi has the largest share in 64K RAMs among the Japanese producers which currently enjoy 70 per cent of the 64K market in the U.S. largely due to their earlier start of mass production than the American competitors. Hitachi thus is most sensitive about the present bilateral disputes on the IC trade, centering on such large-scale memory chips, industrymen say. Its planned cooperation with HP is the first of Hitachi's strategies to help quiet the friction, they noted.

NTT will send mission to inspect American makers

Nippon Telegraph and Telephone Public Corporation (NTT) will send a survey mission to the U.S. for about two weeks from mid-March to visit several American manufacturers of telecommunications equipment.

Since January, 1981, NTT has adopted procedures for procuring from both domestic and foreign companies on an open and competitive basis, and has thus requested proposals from many foreign manufacturers. However, not many American firms have offered their participation. In view of this unexpected fact, NTT has decided to organize and dispatch a mission consisting of NTT personnel to conduct a preliminary survey of American telecommunications equipment manufacturers.

Fuji Electric raises amorphous cell output to 3 million units

Fuji Electric Co. intends to triple its amorphous silicon solar cell production to 3 million units a month (in electronic calculator power source terms) by the end of this year. It is aiming at production cost reductions through more mass manufacture.

Demand is now mounting for such solar batteries of Fuji, the largest maker, from watch and electronic calculator manufacturers. Compared with the expensive conventional single-crystal silicon equivalents, the amorphous silicon solar cells are producible at a far lower cost.

According to the Tokyo company, its commercial production of such cells, started in August, 1980 at its Matsumoto, Nagano Prefecture, factory has continued to snowball through production line expansions.

Hoxan markets 4 in. solar cell panel

Hoxan Corp., a Sapporo-based manufacturer of pressurized gases for industrial and medical markets, has introduced on the market a 4 inch silicon solar cell panel.

The new solar panel, HSP [illegible], priced @ ¥ [illegible], consists of 36 solar cells with an output of 35 W. It has an energy conversion efficiency of 12-13 per cent, nearly equal to that of the 3 inch type.

Toshiba starts supplying Plessey with 16K RAMs

Toshiba Corp. has started supplying Plessey Co. of Britain with 16-kilobit static RAM chips on an original equipment manufacturer (OEM) basis, the Tokyo electronics firm announced last week.

The OEM business tie-up with the British manufacturer of telecommunications and electronic equipment is regarded to show Toshiba's active stance on international cooperation with European firms. Toshiba earlier announced extending technical aid to Italy's SGS-ATES Componenti Elettronici SpA (JEJ March 2 issue). Such moves are aimed at preventing the IC trade friction, now showing signs of aggravation in the U.S., from spreading further to West Europe, analysts here say.

Toshiba already started shipping 16K RAMs for the Ilford, Sussex concern last year-end, and the number of the chips provided by now has reached some 10,000 units. The contract is expected to last for a fairly long period, and the number of the chips to be shipped will reach 20,000 to 30,000 units a month within this year, according to Toshiba officials.

Toshiba-developed 16K static RAMs boast of high integration in memory capacity comparable to 64K dynamic RAMs. Plessey is to incorporate the 16Ks in its communications equipment for the use by the British postal authority.

The Tokyo company already has received requests from other European electronic firms for providing 16Ks on an OEM basis and is ready to offer additional supplies, the officials said.

Sony unveils printer for still video pictures

Sony Corp. last week unveiled in Tokyo a printer for making hard copy prints from video pictures, including television scenes and computer terminal displays. The printer, Mavigraph, is also designed to be incorporated with the Sony-developed "Mavica" still camera, Mavica, which the company bared last August.

Mavica records pictures on small magnetic disks instead of photosensitive films.

Although the quality of the picture obtained by Mavigraph is not as sharp as conventional chemical-process pictures, Sony's new system provides prints both in color and black and white, at cheaper cost and more conveniently, company officials said. Compared with existing devices to produce hard copies from electronic signals, such as ink jet printers, the Mavigraph excels in color reproduction and also is smaller in size, Sony said.

A piece of paper inserted in the Mavigraph automatically wraps around a cylindrical platen, and colors are transferred from four different color sheets — yellow, reddish magenta, bluish cyan and black — with use of 512 thermal elements. Almost any kind of plain paper is usable, and it requires some 5 minutes to print a picture, measuring 120 millimeters x 160 mm or 60 mm x 80 mm. Although the color sheets must be replaced after each printing, each picture costs ¥50 to ¥60, Sony said.

Sony plans to market the Mavigraph in late 1982 for ¥ 200,000, and a home-use smaller type sometime after 1984 for ¥ 100,000.

Sony's 'Mavigraph' printer

ELECTRICALS & ELECTRONICS

INDUSTRY ASSOCIATION REVEALS

Electronic product output in 1981 showed 19.6% gain

Japan's electronics industry turned out in 1981 a total of ¥10,286.2 billion worth equipment, up 19.6 per cent from 1980, the Electronic Industries Association of Japan reported last week. The production topped the ¥10-trillion line for the first time in history, it said.

Among the consumer electronic products, video tape recorders (VTRs) soared 80.1 per cent over the preceding year to ¥1,[illegible] million. Although such conventional consumer products as TV sets and audio equipment suffered slowing sales, the advance of VTRs contributed to the favorable growth of the consumer products as a whole. Their production totaled ¥3,316.3 billion, up 24.6 per cent. The consumer products accounted for 34.2 per cent of the total electronic equipment manufactured during 1981, a margin bigger than either that for industrial equipment or electronic components, the association said.

In the industrial electronics category, communications equipment gained 18.5 per cent to ¥1,145.2 billion. Computers and electric/electronic measuring devices attained year-to-year growths of over 12 per cent. Electronic calculators dropped 27.0 per cent. It was the only commodity to register a year-to-year production drop in terms of value last year.

Helped by advances in sophisticated electronics-applied devices both for consumer and industrial uses, component production grew 23.6 per cent to ¥2,281 billion. Growths were conspicuous for semiconductor elements and integrated circuits (ICs) which increased 28.8 per cent and 29.8 per cent, respectively. Combined production of ICs and semiconductors climbed from ¥884 billion in 1980 to over ¥1 trillion in 1981.

Electronic Equipment Production in 1981
(Change from 1980 in % in parentheses)

	¥ million
Consumer products	3,316,373 (+24.6)
TV sets	[illegible]
(Color TVs)	[illegible]
Video tape recorders	[illegible] (+80.1)
Radios	[illegible]
Tape recorders and players	[illegible]
(Radio recorder combined)	[illegible]
Stereo sets	[illegible]
Stereo components	[illegible]
Others	[illegible]
Industrial equipment	[illegible]
Communications equipment	[illegible] (+18.5)
Electronics-applied devices	[illegible]
(Computers, etc)	[illegible]
Measuring equipment	[illegible]
Electronic calculators	[illegible] (−27.0)
Electronic components	[illegible] (+23.6)
General components	[illegible]
Electronic tubes	[illegible]
Semiconductor elements	[illegible] (+28.8)
Integrated circuits	[illegible] (+29.8)
Liquid crystal elements	77,463 (—)
Grand total	10,286,249 (+19.6)

Exports and Imports of Electronic Equipment in 1981
(Change from 1980 in % in parentheses)

	Exports ¥ million	Imports ¥ million
Consumer products	[illegible] (+27.0)	[illegible]
Industrial equipment	[illegible] (+38.6)	[illegible]
Communications equipment	[illegible]	[illegible]
Electronics-applied devices	[illegible]	[illegible]
Electric measuring devices	[illegible]	[illegible]
Electronic calculators	[illegible]	[illegible]
Electronic components	[illegible] (+18.4)	[illegible]
General parts	[illegible]	[illegible]
[illegible] components	[illegible]	[illegible]
Total	[illegible] (+34.5)	[illegible] (+0.2)

30 per cent for exports

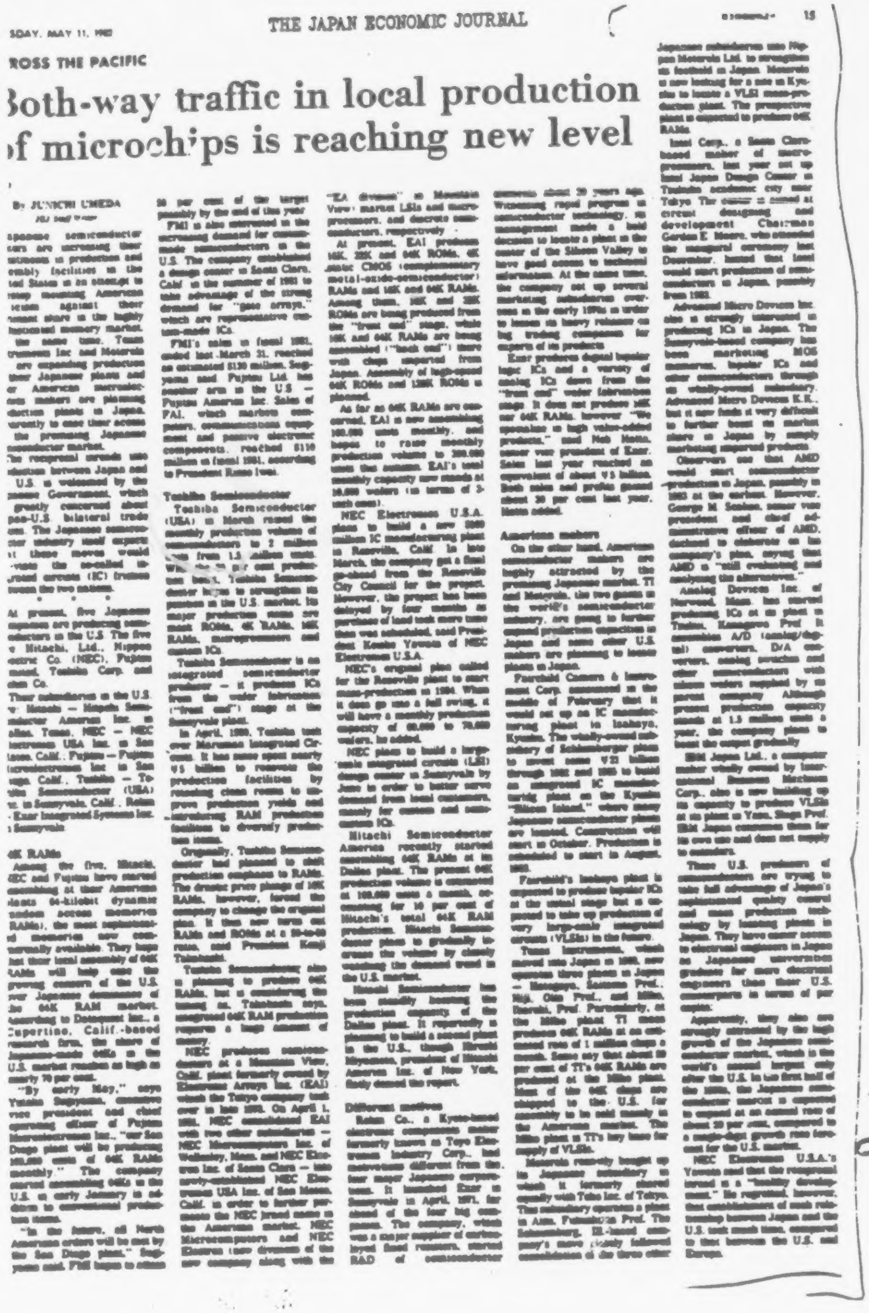
Meanwhile, exports of electronic equipment in 1981 rose 34.5 per cent over 1980 to ¥5,132 billion, while the imports went up a marginal 0.2 per cent to ¥684.3 million, the association reported.

The exports of consumer products gained 27 per cent to ¥2,048.7 billion, it said. The exports thus represented over 50 per cent of the electronic output, and the consumer products more than half of the total exports. The exports of VTRs jumped 2.1-fold to ¥883.5 billion, and were the single biggest export commodity among the electronics. While color TVs remained favorable with the exports soaring 35.3 per cent to ¥288.9 billion, overseas shipments of tape recorders and stereo components showed only slow growths, according to the report.

Industrial equipment rose 38.6 per cent to ¥894.4 billion, helped by favorable export trends in computers and peripherals (up 50 per cent), telephone exchanges and facsimile devices.

Among the components, which rose 18.4 per cent, ICs showed a moderate 4-per cent rise over 1980 with a total shipment of ¥120.6 billion.

Imports were slow except for some components, centering on semiconductors and ICs, and advanced medical electronic equipment, the field some foreign manufacturers have attained strong footholds.



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ROSS THE PACIFIC

Both-way traffic in local production of microchips is reaching new level

By JUNICHI UMEDA
JEJ Staff Writer

apanese semiconductor cers are increasing their estments in production and embly facilities in the ted States in an attempt to resp mounting American icism against their ominant share in the highly hpetitive memory market.

the same time, Texas truments Inc. and Motorola are expanding production their Japanese plants and er American microelectronics makers are planning duction plants in Japan, parently to ease their access the promising Japanese conductor market.

The reciprocal inroads into duction between Japan and U.S. is welcomed by the panese Government, which greatly concerned about pan-U.S. bilateral trade ues. The Japanese semiconductor industry itself expects at these moves would -vate the so-called integrated circuits (IC) friction tween the two nations.

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At present, five Japanese mpanies are producing semiconductors in the U.S. The five e Hitachi, Ltd., Nippon ectric Co. (NEC), Fujitsu mited, Toshiba Corp. and ohm Co.

Their subsidiaries in the U.S. e: Hitachi — Hitachi Semiconductor America Inc. in allas, Texas; NEC — NEC lectronics USA Inc. in San ateo, Calif.; Fujitsu — Fujitsu icroelectronics Inc. in San ego, Calif.; Toshiba — Toshiba Semiconductor (USA) c. in Sunnyvale, Calif.; Rohm — Exar Integrated Systems Inc. Sunnyvale.

4K RAMs

Among the five, Hitachi, EC and Fujitsu have started assembling at their American ants 64-kilobit dynamic andom access memories RAMs), the most sophisticated memories now commercially available. They hope hat their local assembly of 64K AMs will help ease the growing concern of the U.S. ver Japanese dominance of he 64K RAM market. According to Dataquest Inc., a upertino, Calif.-based research firm, the share of Japanese-made 64Ks in the U.S. market reaches as high as nearly 70 per cent.

"By early May," says Yutaka Sugiyama, executive vice president and chief operating officer of Fujitsu Microelectronics Inc., "our San Diego plant will be producing 100,000 units of 64K RAMs monthly." The company started assembling 64Ks in the U.S. in early January in addition to conventional production items.

"In the future, all North American orders will be met by the San Diego plant," Sugiyama said. FMI hopes to attain 50 per cent of the target possibly by the end of this year.

FMI is also interested in the increasing demand for custom-made semiconductors in the U.S. The company established a design center in Santa Clara, Calif. in the summer of 1981 to take advantage of the strong demand for "gate arrays," which are representative custom-made ICs.

FMI's sales in fiscal 1981, ended last March 31, reached an estimated $130 million, Sugiyama said. Fujitsu Ltd. has another arm in the U.S. — Fujitsu America Inc. Sales of FAI, which markets computers, communications equipment and passive electronic components, reached $110 million in fiscal 1981, according to President Ramo Iwai.

Toshiba Semiconductor

Toshiba Semiconductor (USA) in March raised the monthly production volume of semiconductors to 2 million units from 1.5 million units. With the 30 per cent production boost, Toshiba Semiconductor hopes to strengthen its position in the U.S. market. Its major production items are mask ROMs, 4K RAMs, 16K RAMs, microprocessors and custom ICs.

Toshiba Semiconductor is an integrated semiconductor producer — it produces ICs from the wafer fabrication ("front end") stage at the Sunnyvale plant.

In April, 1980, Toshiba took over Maruman Integrated Circuits. It has since spent nearly ¥5 billion to renovate the production facilities by remodeling clean rooms to improve production yields and introducing RAM production facilities to diversify production items.

Originally, Toshiba Semiconductor had planned to shift production emphasis to RAMs. The drastic price plunge of 16K RAMs, however, forced the company to change the original plan. It then now turns out RAMs and ROMs at a 50-to-50 ratio, said President Kenji Takahashi.

Toshiba Semiconductor also is planning to produce 64K RAMs, but is considering the timing on, Takahashi says, integrated 64K RAM production requires a huge amount of money.

NEC produces semiconductors at a Mountain View, Calif. plant formerly owned by Electronic Arrays Inc. (EAI) which the Tokyo company took over in late 1978. On April 1, 1981, NEC consolidated EAI with two other subsidiaries — NEC Microcomputers Inc. of Wellesley, Mass. and NEC Electron Inc. of Santa Clara — into newly-established NEC Electronics USA Inc. of San Mateo, Calif. in order to further promote the NEC brand name in the American market. NEC Microcomputers and NEC Electron (now divisions of the new company along with the "EA division" in Mountain View) market LSIs and microprocessors, and discrete semiconductors, respectively.

At present, EAI produces 16K, 32K and 64K ROMs, 4K static CMOS (complementary metal-oxide-semiconductor) RAMs and 16K and 64K RAMs. Among them, 16K and 32K ROMs are being produced from the "front end" stage, while 16K and 64K RAMs are being assembled ("back end") there with chips imported from Japan. Assembly of high-speed 64K ROMs and 128K ROMs is planned.

As far as 64K RAMs are concerned, EAI is now assembling 100,000 units monthly, and hopes to raise monthly production volume to 300,000 units this autumn. EAI's total monthly capacity now stands at 30,000 wafers (in terms of 3-inch ones).

NEC Electronics U.S.A. plans to build a new $100 million IC manufacturing plant in Roseville, Calif. In late March, the company got a final go-ahead from the Roseville City Council for the project. However, the project has been delayed by four months as purchase of land took more time than was scheduled, said President [illegible] Yawata of NEC Electronics U.S.A.

NEC's original plan called for the Roseville plant to start mass-production in 1984. When it does go into a full swing, it will have a monthly production capacity of 60,000 to 70,000 wafers, he added.

NEC plans to build a large-scale integrated circuits (LSI) design center in Sunnyvale by June in order to better serve demand from local customers, mainly for custom and semi-custom ICs.

Hitachi Semiconductor America recently started assembling 64K RAMs at its Dallas plant. The present 64K production volume is estimated at 100,000 units a month, accounting for 10 per cent of Hitachi's total 64K RAM production. Hitachi Semiconductor plans to gradually increase the volume by closely watching the demand trend in the U.S. market.

Hitachi Semiconductor has been steadily boosting the production capacity of the Dallas plant. It reportedly is planning to build a second plant in the U.S., though Hiroshi Miyamoto, president of Hitachi America Inc. of New York, flatly denied the report.

Different motives

Rohm Co., a Kyoto-based electronic components maker formerly known as Toyo Electronics Industry Corp., had motivations different from the four major Japanese corporations. It launched Exar in Sunnyvale in April, 1971, far ahead of the four big companies. The company, which was a major supplier of carbon-layed fixed resistors, started R&D of semiconductor elements about 20 years ago. Witnessing rapid progress in semiconductor technology, its management made a bold decision to locate a plant in the center of the Silicon Valley to have good access to technical information. At the same time, the company set up several marketing subsidiaries overseas in the early 1970s in order to lessen its heavy reliance on big trading companies for exports of its products.

Exar produces digital bipolar logic ICs and a variety of analog ICs down from the "front end" wafer fabrication stage. It does not produce 16K nor 64K RAMs, however. "We specialize in high value-added products," said Nob Hotta, senior vice president of Exar. Sales last year reached an equivalent of about ¥5 billion. Both sales and profits gained about 30 per cent last year, Hotta added.

American makers

On the other hand, American semiconductor makers are highly attracted by the promising Japanese market. TI and Motorola, the two giants in the world's semiconductor industry, are going to further expand production capacities in Japan and some other U.S. makers are planning to locate plants in Japan.

Fairchild Camera & Instrument Corp. announced in the middle of February that it would set up an IC manufacturing plant in Isahaya, Kyushu. The wholly-owned subsidiary of Schlumberger plans to invest some ¥21 billion through 1982 and 1985 to build an integrated IC manufacturing plant on the Kyushu "Silicon Island," where many Japanese semiconductor plants are located. Construction will start in October. Production is scheduled to start in August, 1983.

Fairchild's Isahaya plant is expected to produce bipolar ICs at the initial stage but is expected to take up production of very large-scale integrated circuits (VLSIs) in the future.

Texas Instruments, which moved into Japan in 1968, now operates three plants in Japan — Hatogaya, Saitama Pref., Hiji, Oita Pref., and Miho, Ibaraki Pref. Particularly, at the Miho plant TI mass produces 64K RAMs at an estimated rate of 1 million chips a month. Some say that about 80 per cent of TI's 64K RAMs are produced at the Miho plant. Most of the 64K chips are shipped to the U.S. for assembly to be sold mainly in the American market. The Miho plant is TI's key base for supply of VLSIs.

Motorola recently bought up its Japanese subsidiary in which it formerly shared equally with Toko Inc. of Tokyo. The subsidiary operates a plant in Aizu, Fukushima Pref. The Schaumburg, Ill.-based company's move closely followed consolidation of the three other Japanese subsidiaries into Nippon Motorola Ltd. to strengthen its foothold in Japan. Motorola is now looking for a site in Kyushu to locate a VLSI mass-production plant. The prospective plant is expected to produce 64K RAMs.

Intel Corp., a Santa Clara-based maker of microprocessors, last year set up Intel Japan Design Center in Tsukuba academic city near Tokyo. The center is aimed at circuit designing and development. Chairman Gordon E. Moore, who attended the inaugural ceremony last December, hinted that Intel would start production of semiconductors in Japan, possibly from 1983.

Advanced Micro Devices Inc. also is strongly interested in producing ICs in Japan. The Sunnyvale-based company has been marketing MOS memories, bipolar ICs and other semiconductors through its wholly-owned subsidiary, Advanced Micro Devices K.K., but it now finds it very difficult to further boost its market share in Japan by simply marketing imported products.

Observers see that AMD would start semiconductor production in Japan, possibly in 1983 at the earliest. However, George M. Scalise, senior vice president and chief administrative officer of AMD, declined to elaborate on his company's plan, saying that AMD is "still evaluating and analyzing the alternatives."

Analog Devices Inc. of Norwood, Mass. has started producing ICs at its plant in Tsukui, Kanagawa Pref. It assembles A/D (analog/digital) converters, D/A converters, analog switches and other semiconductors with silicon wafers supplied by its parent company. Although present production capacity stands at 1.5 million units a year, the company plans to boost the output gradually.

IBM Japan Ltd., a computer maker wholly owned by International Business Machines Corp., also is now building up its capacity to produce VLSIs at its plant in Yasu, Shiga Pref. IBM Japan consumes them for its own use and does not supply to outsiders.

These U.S. producers of semiconductors are trying to take full advantage of Japan's sophisticated quality control and mass production technology by locating plants in Japan. They have easier access to electrical engineers in Japan as Japanese universities graduate far more electrical engineers than their U.S. counterparts in terms of per capita.

Apparently, they also are strongly attracted by the high growth of the Japanese semiconductor market, which is the world's second largest only after the U.S. In the first half of the 1980s, the Japanese semiconductor market is expected to expand at an annual rate of about 20 per cent, compared to a single-digit growth rate forecast for the U.S. market.

NEC Electronics U.S.A.'s Yawata said that the reciprocal inroad is a "healthy development." He regretted, however, that establishment of such relationship between Japan and the U.S. took much time, compared to that between the U.S. and Europe.

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ELECTRICALS & ELECTRONICS

NTT will form joint firm to make custom-made LSIs

Nippon Telegraph & Telephone Public Corp will set up a new company to manufacture custom-made LSIs jointly with major banks, etc., it was learned last week.

Utilizing its highly reputed technology in designing and processing LSIs and VLSIs, the Government-run corporation that will become an integrated developer-manufacturer of such sophisticated semiconductors. Although the new NTT unit is aimed at meeting in-house demand initially, it plans to start taking orders from outside users in the future. If realized, such business activities of NTT on the market are sure to create a dispute among semiconductor companies here along with current discussions about the plan of turning NTT into private-run companies as part of administrative reform.

Although it is yet unknown whether the new NTT unit will venture into international businesses, it is most likely that the new company will intensify international competition for sophisticated microchips and other semiconductors, industrymen say.

Tentatively named Japan Electronic Technology, the new NTT unit will be set up on June 14 in Musashino City, western Tokyo. It will be capitalized at ¥100 million, of which 50 per cent will be owned by NTT, 28.5 per cent by nine banks including Dai-Ichi Kangyo, Fuji, Sumitomo and Industrial Bank of Japan, 5 per cent by the Telecommunications Association, and the rest by a NTT subsidiary and others.

Utilizing the new company, NTT intends to streamline its semiconductor development activities and to speed up processes to complete each project, according to its officials. Experimental and custom-made LSIs so far have been processed either in NTT laboratory facilities or by outside manufacturers. The former caused complaints from its researchers that they lacked facilities for manufacturing, and the latter posed danger of leakage of know-how on processes still in development.

The new firm expects a modest sales of ¥300 million in the initial year.

Matsushita to sell one-chip speech recognition LSI

Matsushita Electric Industrial Co. and its semiconductor subsidiary, Matsushita Electronics Corp., will start accepting orders for the world's first one-chip speech recognition LSI, MN-1263, along with a speech recognition circuit board with the chip from this June.

Using the MN-1263 chip which integrates the spectrum analysis circuit and pattern matching circuit into one chip, the speech recognition unit can recognize a maximum of 64 words of registered voice. Potential applications range from voice-command operations for consumer electric and electronic products to equipment working in a dark place to equipment for the physically-handicapped.

Compared with the conventional systems for the similar purpose, the new speech recognition unit has become smaller than half in size and mass-producible at half the cost, Matsushita said. The one-chip LSI has made the capacity of the unit far simpler, it said. The simplification was made enabled by the adoption of the so-called "Walsh-Hadamard Transform" for processing digital signals from input voice, which eliminates the complicated analog-digital filtering process indispensable in conventional systems.

NEC and ALCOA will market satellite TV receivers in U.S.

Nippon Electric Co. (NEC) and Aluminum Co. of America have reached an agreement to establish a joint venture company to market satellite television receivers in the U.S.

The new joint venture company, ALCOA-NEC Communications Corp., will be capitalized at $1 million (authorized capital: $2 million) and be based in Chicago, Ill. ALCOA will have a share of 51 per cent, and NEC the remainder.

A satellite television receiver is a device that can receive television programs at home directly from a broadcast satellite. Satellite television broadcasting services are expected to commence in the U.S. in mid-1980s. More than 10 American companies, including RCA Corp. and Satellite Television Corp. (a unit of COMSAT), have already applied for right to start the service to the Federal Communications Commission (FCC), which is expected to give permission for experimental broadcasting to a few companies by this summer, sources said.

Full-scale satellite broadcasting services will include video information service, and demand for satellite TV receivers will exceed 4 million units a year in the U.S., the two companies expect.

A satellite TV receiver will consist mainly of a low-noise converter, a receiver/demodulator and a parabolic antenna. NEC is to supply low-noise converters and receiver/demodulators, while ALCOA will be responsible for antennas.

NEC has wanted for some time to enter into the promising American market, and ALCOA made an offer to the Tokyo company for establishment of a joint venture company, a statement released by the two firms said. Based in Pittsburg, Penn., the prominent aluminum refining company is actively trying to diversify its business lines.

Mitsubishi and ERC will jointly make new fuel cells

A dissolved carbonate fuel cell widely recognized as the most promising of chemical reaction heat batteries, is being developed by Mitsubishi Electric Corp. and Energy Research Corp. (ERC) of Danbury, Connecticut.

According to Mitsubishi Electric, the cell, using a carbonic alkali salt as its principal electrolytic material, has been known as a potential cell superior to existing ones which use a phosphoric acid water solution. It has a far higher electric generating heat, no need for a platinum catalyst, and a simpler structure.

Mitsubishi said it has already started a technological study setup under a renewable five-year contract with ERC, sending its engineers to ERC.

Sony will sell small computers

Sony Corp. last week unveiled its first personal computer line, called Micro Computer SMC-70, which will be marketed in the U.S. from next September.

In standard form, the SMC-70 is an 8-bit machine with a memory capacity of 64 kilobytes. With the addition of an adapter unit, it turns into a 16-bit computer with a 1-megabyte memory capacity, according to Sony.

The SMC-70 central unit is to be priced at $1,475 in the U.S., and around $4,300 as a complete system including a 3.5-inch dual micro floppy disc drive, a dot matrix printer and a component TV.

Heavy machinery makers put bigger stress on turning out electromechanical items

Japanese heavy machinery makers have been stepping up their efforts recently to strengthen their electromechanical sections in order to boost sagging demand both at home and abroad by introducing semiconductors into heavy machinery manufacturing.

Mitsubishi Heavy Industries, Ltd. put on the market an offset printing machine equipped with built-in microcomputers, whereas Ishikawajima-Harima Heavy Industries Co. and Kawasaki Heavy Industries, Ltd. are trying to develop computer-based new products and set up a sales network suitable for the microcomputer era.

The new trend in the heavy machinery industry is likely to lead to the emergence of new products in the fields of printing, construction and conveying machinery in the future.

The heavy machinery makers took a cool stand at first about bringing electronic technologies into their products since they were dealing with large-scale manufactured goods in such fields as shipbuilding and plant construction. Most of the heavy machinery makers were uninterested in industrial robots. A company official of Mitsubishi Heavy Industries said, "The market for industrial robots was rather small in scale and therefore not so attractive."

Meanwhile, demand for construction machines both at home and abroad dropped sharply while that for printing machines, injection molding machines and conveying machines began to slacken. In this context, heavy machinery makers have come to show interest in the use of microcomputers in the belief that computerization of their products would give them an upper hand in their sales competition.

For example, Mitsubishi and Dai Nippon Printing Co. last year succeeded in jointly merchandising the world's first offset printing machine with built-in microcomputers which enable the printing machine to automatically match colors for multi-colored printing. The computerized printer would thus no longer require skilled workers for color matching.

Ishikawajima-Harima delivered a world's largest computer-controlled automatic warehouse for automobiles to a factory of Nissan Motor Co. and is likely to step up its effort to increase the sales of computer-aided conveying machinery.

Mitsui Engineering & Shipbuilding Co. also started manufacturing products in the fields of computer-aided design (CAD) and computer-aided manufacturing (CAM).

More mach. firms take up OA work

An increasing number of heavy duty electrical machinery makers are trying to expand their business operations by manufacturing office automation equipment and reinforce their electromechanical section through production of industrial robots.

The efforts are being made because the heavy duty electrical machinery industry has been unable to recover from the business recession rapidly with power companies curtailing their plant and equipment investment.

Takaoka Electric Mfg. Co., a middle-scale heavy duty electrical machinery maker, affiliated with Tokyo Electric Power Co., put on the market a Japanese-language-based office computer KTOS-11 which is claimed to be easily operated by anyone in the office. The company hopes to sell 100 units of the office automation equipment this year with one unit priced about ¥14 million. Takaoka was directly affected by the cutback on the capital spending by power companies because the company chiefly manufactures transmitters, distributors and transformers of the heavy duty electrical machinery section.

Toyo Denki Seizo K.K., a middle-scale heavy duty electrical machinery maker, has also joined the office automation equipment market with its standard computer-aided design (CAD) system.

Shinko Electric Co. has developed an arc welding robot "Arcman-S" jointly with its parent company Kobe Steel, Ltd. and will receive orders for the industrial robots starting next month.

New EIAJ head refutes criticism

Tadahiro Sekimoto, who last week was elected as president of the Electronic Industries Association of Japan, told the press that he would further strive to lessen trade frictions with other countries.

As for the American criticisms over Japan's exports of 64-kilobit random access memory (RAM) chips, Sekimoto, who concurrently is the president of Nippon Electric Co., a major producer of the sophisticated 64K RAMs, said, "Japan actually leads the 64K trade at the moment. But this is something like being at the front in the first one or two kilometers in a marathon. In such fields like logical semiconductors and microcomputers, together with software, Japan imports more from the U.S. than its exports."

Sony develops non-interlace scanning system

Sony Corp. said it has developed a new color TV scanning system, called Non-Interlace system, based on digital technology. The Non-Interlace scanning system improves the picture quality of standard color television by digitally processing the signals transmitted from ordinary broadcast stations, Sony said.

In conventional TV reception in Japan, 2:1 interlace scanning is used to form one picture in two fields, using 525 scanning lines. Specifically, the first 262.5 lines run in a 60th of a second and the other 262.5 lines are scanned in the following 1/60 second to reproduce an image.

In the conventional system, adjacent scanning lines light only 30 times per second alternately. Since the picture tube lights extremely briefly and a human optical afterimage does not last very long, line flickers appear in the picture.

In the Non-Interlace system, the lines are doubled by adding an interim line between each two scanning lines. To insert the additional scanning line, digital technology is incorporated into interpolational information processing. As two lines are scanned in each scanning time unit, one whole picture is formed in one field with 525 scanning lines.

With this, the scanning lines become almost invisible, and line flickers are drastically decreased, according to Sony.

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Hitachi is slated to double output of 64K RAM chips

Hitachi, Ltd. will raise the production capacity of 64-kilobit dynamic random access memory (RAM) chips from the present 1 million units a month to 2.2 million units by the year-end, sources within the Tokyo company revealed.

Hitachi could become the first company anywhere in the world that processes more than 2 million units of 64K RAMs, currently the most sophisticated memory chips, in a month.

After starting mass production of 64K RAMs at the rate of 100,000 chips a month late in 1980, Hitachi boosted its capacity to 300,000 units in the spring of 1981, to 700,000 units last year-end, and to 1 million chips at the end of March, this year.

This remarkable step-up in 64K RAM production reflects growing demand for the first generation VLSI (very large-scale integration). In the U.S., the major export market for Japanese semiconductor firms, increasing numbers of computer builders began procuring 64K RAM in large lots for use in both large and small computers, in place of the formerly dominant 16K RAM chips. In Japan also, more and more electronic firms are using 64Ks as major components in computers from large-sized to small business types, and in measuring equipment.

"Actually, we can hardly meet all the orders from customers recently for 64Ks," said a Hitachi official.

The bullish plan of Hitachi, however, draws some frowns among the industry that it would aggravate the now smoldering microchip trade dispute between the U.S. and Japan. Although such major U.S. semiconductor makers as Texas Instruments Inc. and Motorola, Inc. are ready to strike back at Japanese-made 64Ks by stepping up mass production, some quarters in American industry still are said to be complaining that Japanese makers are dumping microchips on the U.S. market.

Nippon Electric Co. and Fujitsu Limited, both producing 1 million 64Ks a month, seem to be still cautious about boosting the production capacity above the present level, chiefly from considerations of possible friction with the Americans.

64K of very fast processing speed

Hitachi, Ltd. is going to start marketing a new line of 64K RAM chips this month whose information processing speed is held to be one of the fastest in the world for a 64K RAM.

According to the Tokyo electronic giant, the access time of an HM-4864A series microchip is 120 nano-seconds (one nanosecond is a billionth of a second). The fastest processing speed of a Hitachi-made 64K before the HM-4864A was 150 nano-second, and the speed for the latest model "will be one of the fastest in the world," a Hitachi official said.

Although having four times more information storage capacity than the 16K RAMs, 64Ks used to be inferior in processing speed to 16Ks. Hitachi expects growing demand for faster 64Ks from computer builders both in Japan and abroad for use in central processing units of large computers.

The HM4864A-12 will be priced at ¥2,200, on a sample shipment basis for domestic volume buyers purchasing more than 1,000 units, Hitachi said.

IC exports to U.S. in Mar. rose 44% over year ago

The exports of integrated circuits (ICs) to the U.S. in March soared 44.3 per cent to ¥8,385 million, while imports from it rose 10.4 per cent to ¥6,757 million, the Electronic Industries Association of Japan said in a preliminary monthly report.

The balance was ¥1,628 million in favor of Japan, in contrast to Japan's deficit of ¥310 million registered in the same month a year earlier.

During the first quarter, Japan exported ¥22,015 million worth of ICs, up 37.8 per cent over a year-before period, while it imported ¥18,741 million, up 15.1 per cent. The trade balance in the period thus was in favor of Japan by ¥3,274 million, compared with its deficit of ¥2,325 million in the corresponding period in 1981, EIAJ said.

In entire 1981, Japan posted a surplus in IC trade with the U.S. of ¥700 million.

ELECTRICALS & ELECTRONICS

Sony licenses technology on producing high-purity silicon

Sony Corp. has granted licenses for industrial application of its high-efficiency, high-purity silicon single crystal production method to four major Japanese silicon makers.

The quartet, the first licensees of Sony's "MCZ" process, have been identified as Shinetsu Handotai Co., Japan Silicon Co., Osaka Titanium Co. and Komatsu Electronic Metals Co.

The "MCZ" process, short for the "magnetic field Czochralski" process, is a "magnetic" version of the Czochralski (CZ) circular pull-up method of making silicon single crystals. Specifically, that means pulling up each crystal by making the most of a strong magnetic field.

The MCZ process is said to enhance the purity and reliability of silicon substrates and improve the upstream phase of very large-scale integrations (VLSIs). Sony unveiled its technological achievement on the process at a scientific congress here in June, 1980.

Early this year, the Tokyo company decided to open the method to all would-be licensees for royalty payments.

In the U.S., the Defense Department is said to have a similar method for obtaining high-efficiency VLSI circuits. Sony's decision on licensing its MCZ method has already attracted more than 20 foreign inquiries for licensing it, including one from a Massachusetts Institute of Technology team working for the U.S. Government, those from RCA Corp. and other major appliance makers of the U.S. and Wacker-Chemie GmbH of West Germany, as well as more than 20 domestic inquiries.

Sony has yet to disclose the amounts of royalties and other matters involved in its first four licensing contracts.

Standard format is agreed on for new compact video cassette

Twelve Japanese electronic appliance and magnetic tape producers have agreed on a standardized format for a new compact video cassette which can be played back with conventional VHS-format video tape recorders, Victor Co. of Japan, the developer of both the VHS and new compact cassette formats, announced last week.

The VHS Compact Video Cassette measures 92 millimeters long, 59mm wide and 23mm tall, compared with 188mm x 104mm x 25mm for the conventional VHS cassette. The recording/playing time of the compact VHS cassette is 20 minutes in the 525 line/60 field system which is in use in such countries as Japan and the U.S. Under the television format widely used in Europe (625 line/50 field system), the recording time is 30 minutes, according to JVC.

Recorded compact VHS tapes can be played back in conventional VHS recorders using a VHS cassette adapter having the shape of a conventional VHS tape.

JVC and other electronic companies are planning to unveil small VTRs and cameras utilizing the new compact cassette at the Consumer Electronics Show to be held in Chicago this month. JVC already announced a new portable VCR unit utilizing the compact VHS, codenamed HR-C3.

A VHS Compact cassette shown with a conventional VHS cassette.

A VHS Compact cassette will sell at ¥2,200 in Japan, and the VHS cassette adapter will be priced at ¥6,000.

The new VCR, model HR-C3, will be marketed at the retail price of ¥150,000. JVC expects to sell 10,000 units a month.

The companies adopting the new format also include Akai Electric Co., Fuji Photo Film Co., Hitachi, Ltd., Konishiroku Ampex Co., Matsushita Electric Industrial Co., Sumitomo 3M Limited and TDK Electronics Co.

Kyoto Ceramic to enter office automation field

Kyoto Ceramic Co., world's leading maker of fine ceramics for ICs, has started taking orders from the U.S. and West European electronic companies for its recently developed office automation equipment lines, to be supplied on original equipment manufacturer (OEM) bases.

The OA machines, including a 16-bit personal computer, a compact electronic typewriter and a compact plain paper copier, are the first electronic equipment to be sold by the Kyoto-based company. It so far has marketed only materials for high technology products. The six lines of OA equipment were jointly designed and developed by the Kyoto firm and its subsidiary, Cybernet Industry Co. of Kawasaki City.

Kyoto Ceramic did not elaborate its plan of domestic sales under its own brand name.

In the meantime, Kyoto Ceramic announced it would merge its four units, including Cybernet, next October 1 to become a full-fledged electronic company.

Toshiba to triple microcomputer production

Toshiba Corp. plans to boost production of one-chip microcomputers three-fold by next March to three million units. Its microcomputer production capacity topped one million only last January.

The diversified Tokyo electronic concern expects the one-chip microcomputer to become a mainstay of its semiconductor business in coming years, supported by a widening range of adaptability.

Along with the step-up in production capacity, Toshiba intends to put more emphasis on complementary metal oxide semiconductor (CMOS) microcomputers, which are more energy efficient than conventional types. Such CMOS microcomputers constitute roughly 40 per cent of the total processed by Toshiba now, and it plans to raise the figure to 60 per cent within the fiscal year, ending next March.

Japanese manufacturers turned out about ¥70 billion worth of microcomputers in 1981, up 27 per cent over a year earlier.

ULVAC plans coating work in U.S.

ULVAC Corp., a leading producer of semiconductor manufacturing equipment, will start a titanium nitride vacuum coating treating venture in the U.S.

Tradenamed "Tigold," ULVAC's TiN vacuum coating is a gold-colored, super-hard coating for metals used for cutting tools, machine parts, watch cases and spectacle frames. In Japan, an ULVAC unit, Tigold Co., is handling the vacuum coating business.

With the cooperation of Tigold Co., ULVAC plans to start the TiN vacuum coating business as early as this August at the Kanaoka, headquarters of its subsidiary, ULVAC North American Corporation (UNAC).

In April, UNAC began producing semiconductor processing equipment, such as small vacuum evaporators, and expects to step up this business further to such sophisticated devices as ion implantation equipment. In the semiconductor equipment business, however, returns on the initial investment cannot be hardly recovered in a short time. ULVAC thus decided on the NIT vacuum coating venture in the U.S. "in order to get daily cash income," according to President Chikara Hayashi of the Kanagawa Pref.-based firm.

For the marketing activities of the semiconductor equipment, ULVAC recently has taken over a small factory on lease in San Francisco suburbs for maintenance and after-services. It further will try to form a sales and service network on the U.S. Midwest and West Coast.

Sanyo offers tech. to Beijing firm

Sanyo Electric Co. will extend technical cooperation to China's Beijing Dong-Feng Television Factory on TV tuner assembly, the Osaka company said.

Sanyo already has received an order by the Beijing company for components for 200,000 tuners. It will soon dispatch engineers to the factory in the Chinese capital to offer instructions on assembly.

Dong-Feng now produces 200,000 black and white TVs and 20,000 color TVs a year.

Hitachi uses Intel microprocessor

Hitachi, Ltd. started receiving orders for its first 16-bit personal computer "MB-16001" and a color display "C14-2100" from domestic users. Hitachi will start shipments from next October, the Tokyo company said.

Hitachi adopted in the central processing unit of the MB-16001 an Intel Corp. microprocessor, "8088," instead of a similar product made by Motorola Inc., with which the Tokyo electronics firm is believed to have close relations.

The MB-16001 is to be marketed on the Japanese market for ¥300,000 and the color display "C14-2100" ¥160,000, according to Hitachi.

Nine semiconductor makers eye 21.9% sales increase

Competition among Japanese semiconductor makers will further intensify in the light of their aggressive marketing and capital spending plans.

According to their business programs made available, sales of Japan's nine leading semiconductor makers will rise 21.9 per cent in the current business year. The rate of increase is notable as most of the other industries are in the doldrums.

The nine leaders plan to spend 16.5 per cent more for plant and equipment investment in the 1982 business term. The double-digit increase in planned capital spending indicates that Japanese producers of semiconductors are trying to keep pace with the rapid progress in microelectronics technology.

Capital spendings planned by the Big 9 total ¥222.5 billion, which account for 17.7 per cent of the total estimated sales of ¥1,282 billion.

Fiscal 1982 Sales & Capital Spending Planned by 9 Major Semiconductor Makers

	Sales (¥ billion)			Plant & equipment investments (¥ billion)		
	FY 1982	FY 1981	% change	FY 1982	FY 1981	% change
NEC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Hitachi	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Toshiba	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mitsubishi Electric	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Fujitsu	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Matsushita	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tokyo Sanyo	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oki	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sharp	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Note: Sales of Fujitsu include [illegible] semiconductor division. Sales of Sharp [illegible].

NEC is going to double output of 64K RAMs by next March

Nippon Electric Co. (NEC) will more than double the production capacity of 64-kilobit dynamic random access memory chips to 2.5 million units a month by the end of next March from the present [illegible] million units, informed sources at the company revealed last week.

NEC followed Hitachi, Ltd., which made known in the preceding week that it would double 64K dynamic RAM production capacity to 2.2 million units.

These aggressive production expansion plans by Japan's two leading semiconductor makers are regarded to harbor danger of fueling Japan-U.S. microchip friction.

According to NEC Executive Vice President Atsuyoshi Ouchi, the company has been swamped with inquiries for long-term contracts for 64K dynamic RAMs from American and European makers of computers, peripherals, terminals and telecommunication systems. These inquirers include such well-known computer builders as Honeywell, industrymen observe.

Specifically, NEC plans to raise 64K output by 100,000 units every month to attain 2.5 million units by March, 1983. Until September, the monthly increment will be met mainly at its plant in Kumamoto on the Kyushu "silicon island." In October, its new ¥13 billion plant is expected to start operation in Sagamihara, Kanagawa Pref.

Buildup of photo mask capacity

Dai Nippon Printing Co. will double its production capacity of photo masks for semiconductors to 400,000 units monthly in May, next year.

The Tokyo company will build a new 4,500-square meter plant in Kami-Fukuoka, Saitama Pref. It will spend a total of about ¥7 billion for the plant and production facilities.

Dai Nippon Printing, together with Toppan Printing Co., now controls about 80 per cent of Japan's photo mask market.

Insulating material production climbs 3%

Output of electrical insulating materials in fiscal 1981, ended last March, rose 3 per cent from the preceding year to a value of ¥20,970 million, the Japan Electrical Insulating Materials Industrial Association reported last week.

Exports reached ¥4,460 million, up 1 per cent.

Osaka Titanium markets silicon wafers in U.S.

Osaka Titanium Co. has started full-scale marketing of silicon wafers in the U.S.

The Amagasaki (Osaka) company has established a silicon wafer marketing company in San Francisco. The new company, capitalized at $250,000, is a joint venture of Osaka Titanium and its subsidiary, Kyushu Electronic Metal Co.

Osaka Titanium last year started selling silicon wafers in the U.S. by concluding a business arrangement with Motorola Inc., the world's second largest semiconductor maker. It opened a branch office in San Francisco in April, 1981.

Shipments to the U.S. in the 1981 business year, ended last March, were limited to ¥400 million due mainly to the recession of the U.S. semiconductor industry. With the new marketing company, Osaka Titanium hopes to raise exports to the U.S. to ¥1.8 billion this year to account for 10 per cent of its total sales of silicon wafers.

ELECTRICALS & ELECTRONICS

All eight leading computer firms record double digit performances

— Fujitsu continues to retain top position —

Fujitsu Limited last year retained its No. 1 position in the Japanese computer market, though its gap with the second-ranked IBM Japan Ltd. narrowed greatly.

All of the eight major Japanese computer companies recorded double-digit gains in sales of computers and related equipment in the 1981 business year. The high rates of increase, ranging from 28.8 per cent for IBM Japan to 15.2 per cent for Hitachi, Ltd., were ascribed mainly to rapid progress in office automation and continued rationalization efforts at industrial plants.

Noteworthy is that most of the eight companies raised exports of computers and related equipment by more than 30 per cent. This indicated they had strengthened their overseas strategies.

Sales of Fujitsu's computer division in fiscal 1981 (April, 1981-March, 1982) rose 17.4 per cent from the preceding term to ¥448.4 billion. Fujitsu attributed the performance chiefly to favorable sales of large general-purpose computers, magnetic disc drives, office computers and software. Fujitsu's exports shot up 57 per cent to ¥38 billion.

IBM Japan's sales increased more sharply than Fujitsu's. The wholly-owned subsidiary of International Business Machines Corp. saw its sales gain 28.8 per cent to reach ¥428.9 billion in the 1981 business year, ended last December. The rate of increase in sales contrasted with the merely 4.3 per cent gain in the preceding term.

With the jump, IBM Japan narrowed its gap with top-ranked Fujitsu to ¥19.5 billion from ¥43.7 billion in the 1980 business year. IBM Japan lost the top position in 1979 to Fujitsu by a margin of ¥2.6 billion.

IBM Japan has become a major base for supplying computers and related products to other IBM group companies in the world. IBM Japan's exports in 1981 rose 56 per cent to ¥160.3 billion.

Nippon Electric Co. (NEC) outranked Hitachi to become the third largest computer builder in Japan. Oki Electric Industry Co. also outstripped Toshiba Corp. and placed fifth.

Sales of NEC's computer division rose 24 per cent to ¥232.5 billion. Tripled shipments of personal computers helped NEC fulfill its long-time "dream" to surpass Hitachi in the computer field.

Hitachi's sales of computers and related products gained 15.2 per cent to ¥280 billion. It fell behind NEC in sales of personal computers, though its IBM-compatible general-purpose computers sold well.

Oki's sales topped the ¥100 billion mark in the 1981 business term, recording ¥100.1 billion, up 15.5 per cent. Small printers and office automation equipment sold favorably.

Toshiba, which has been competing with Oki neck and neck, sold ¥96 billion worth of computers and related products last year, up 18.3 per cent.

Nippon Univac Kaisha, Ltd., a joint venture of Sperry-Univac and Mitsui & Co., increased its sales by 15.6 per cent to ¥90.9 billion due partly to new entries in personal computer, word-processor and other office automation equipment fields.

Mitsubishi Electric Corp. ranked eighth, unchanged from the preceding year, with its sales of computers and related products totaling ¥72 billion, up 17.7 per cent.

All the eight computer companies plan to achieve a double-digit sales increase in the current business term. They will vie for larger shares particularly of the office automation equipment market, which has been expanding at a remarkably fast pace.

Sales of 8 Major Computer Builders
(Computer Division; ¥ billion)

	FY 1981	FY 1982 (estimated)
Fujitsu	448 (+17.4)	[illegible]
IBM Japan	428 (+28.8)	[illegible]
NEC	232 (+24.0)	[illegible]
Hitachi	280 (+15.2)	[illegible]
Oki	100 (+15.5)	[illegible]
Toshiba	96 (+18.3)	[illegible]
Nippon Univac	90 (+15.6)	[illegible]
Mitsubishi	72 (+17.7)	[illegible]

Note: Percentage change from the previous term in parentheses. [illegible]

42% of installed computers in world are those of IBM

The total number of general-purpose computers installed in the world reached 145,000 as of the end of 1980, with International Business Machines Corp. (IBM) having the largest market share of 42 per cent as to installation, according to the 1982 Computer Yearbook published recently.

The computer yearbook, compiled by Japan Information Processing Development Center, shows that Fujitsu Limited had a 4 per cent market share in the world's computer market, the largest among Japanese computer makers, followed by Nippon Electric Co. (NEC) with a 2-per cent market share.

IBM's market share reached 56 per cent in terms of value, making the company the largest computer maker in the world, according to the yearbook.

The computer yearbook shows that the total number of general-purpose computers in use in the world reached 184,000 units, worth $136,000 million.

In terms of the market share in volume, IBM accounted for 42.2 per cent, followed by makers of East European countries, including the Soviet Union, with a combined market share of 12.0 per cent, Honeywell 10.0 per cent, Burroughs 5.2 per cent and Univac 4.6 per cent. Following them are ICL, NCR, Fujitsu and NEC, the yearbook says.

By country, the United States boasts the largest number of installations of the computers in the world, accounting for 34 per cent of the world's total installations of general-purpose computers (or 43 per cent in terms of value), according to the yearbook.

The U.S. market for computer services amounted to $18 billion in 1981, more than five times as large as the market in Japan, including $9.7 billion for information processing services and $2.6 billion for software package industry.

The yearbook also shows that the total number of computer service companies in the world reached 4,200 in 1980, with IBM being No. 1 in terms of ranking, followed by Control Data Corp. (CDC) and Computer Sciences Co. (CSC).

IBM's sales from computer service business amounted to $720 million, whereas sales of Nippon Business Consultant, Japan's top computer service company, reached about ¥15 billion — less than 1/11th of IBM's, according to the yearbook.

IBM purchases 17 robots from Matsushita El

International Business Machines Corp. of the U.S. will purchase robots from Matsushita Electric Industrial Co., informed sources revealed last week.

They recently signed a contract for 17 units of robots, worth ¥400-500 million, the informants said.

The robots are for automatically feeding electronic components and fixing them on printed circuit boards. IBM is said to be intending to install them at its electronic typewriter manufacturing plant in Lexington, Ken.

IBM reportedly hopes to purchase from Matsushita more sophisticated robots, such as those for mounting large-scale integrated circuits on printed circuit boards for computers.

The IBM order is expected to stimulate Matsushita further to accelerate development of various kinds of robots. The Matsushita group of companies are now engrossed in robot development, hoping to become a leader in this field. As IBM recently bared intention of moving into the robot market, there is possibility that IBM and Matsushita will exchange robot technologies in the future.

ASAHI
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June 15, 1982

Will Give Aid to Venture Business in Fields of Funds and Taxes; MITI's Policy

MITI has firmed up the policy of establishing, by the next fiscal year, a system for financial aid to research-development-type business (venture business) and aid measures in the field of taxes, to promote the development of advanced technology in a positive way. Venture business to tackle the development of semi-conductors, computers, etc., is a source of vitality of Japanese industries. However, as there are many cases of racking their brains over the procurement of funds, the Ministry has decided to embark upon backing them up in the fields of funds. The US and France also are making efforts to foster venture business, and it is likely that the international competition in the "new age of technology" will become severer.

In Japan, there are about 3,000 companies engaged in venture business at present, and they are furiously competing with one another in the development of advanced technology. The amount of their capital is small, ranging from several million yen to about ¥200 million, but they have superior technicians. There are also enterprises exclusively studying new materials and biological engineering, in addition to the development of semi-conductors, computers, machine tools, etc.

What is common among these enterprises is the agony over the procurement of funds. Huge amounts of funds are necessary for development, and, moreover, a long period of time is required before merchandising. Only about 10 years have passed since the establishment of the enterprises themselves. In addition, the amounts of their capital are small, and they lack power of operation. There are already six private investment companies covering venture business, but the enterprises which receive investments are centered on stabilized ones, and the amount of investments is limited, too.

This is why MITI, which is pushing Japan's become a country established on the basis of technology, has embarked upon positive aid. It is pushing the formulation of concrete measures in the fields of funds and taxes. In the field of financial aid, it will lend funds for Treasury investments and loans to venture business through the Medium and Small Enterprises Financing Corporation. In addition, it is thinking of opening a way to secure funds through the issuance of shares, by facilitating the transactions of shares of venture business by easing the conditions for over-the-counter sales of shares.

It is also checking into the expansion of the framework of guarantees (¥900 million at present) by the "Research-Development-Type Enterprises Fostering Center," which guarantees enterprises' liabilities at the time they borrow funds for research and development, and into the carrying out of investment and financing enterprises by the Center itself, moving one step from the guarantee of liabilities.

In the field of taxes, on the other hand, it is pushing co-ordination of opinions within the Government in the direction of excluding the investments in venture business from the objects of taxation, in order to promote investments by private circles. In addition, it is checking into the establishment of an investment insurance system covering venture business, and the utilization of investment trust for it. The Ministry intends to set such new policies as star items of its enterprises for the next fiscal year. Together with this, it will check into the establishment of a "Research-Development-Type Medium and Small Enterprises Investment Promotion Law" (tentative name) consolidating all these policies.

LECTRICALS & ELECTRONICS

VERING EXTENSIVE RANGE

itsubishi Elec. & Sperry onclude computer tie-up

itsubishi Electric Corp last [illegible] concluded a business arrangement with Sperry Corp of U.S. in the field of com rs. They will cooperate in elopment, production and keting of computers.

e collaborative arrangement was announced in Tokyo Monday last week jointly by ubishi President Nihachiro ayama and Sperry Chairman Gerald G. Probst.

nder the five-year agreement, Mitsubishi and Sperry exchange computer technologies in which they have a petitive edge. Mitsubishi els in small- and medium-e machines, while Sperry highly advanced techniques large-size machines. The plementary relations will them strengthen their itions in the computer and ce automation equipment fields, industrymen here observe.

lso, Mitsubishi will supply semiconductors, computer ipherals and terminals to rry and help the American pany boost sales of Sperry-vac computers in Japan.

pecific subjects and methods implementation will be for documented by the two panies based on this agreement. Individual contracts will made for respective items of peration. The cooperation will include exchange of technological information and personnel.

Katayama said, "Mitsubishi sees the electronics sector at the leading edge of today's technological advance. The agreement will significantly enhance our development power in this strategically important area."

Sperry's Probst described this agreement as "a two-way street for technological development which should strengthen each company's ability to serve its customers worldwide."

Mitsubishi and Sperry have had business relations for 10 years though indirectly. Mitsubishi has a 1.36 per cent interest in Nippon Univac Kaisha, Ltd., a computer marketing company 34.66 per cent-owned by Sperry. Mitsubishi also has an 8 per cent interest in Oki Univac Kaisha, Ltd., a computer maker 45 per cent-owned by Sperry.

Sumitomo will sell computers of Trilogy

Trader Sumitomo Corp. will market in Japan very large-scale computers of Trilogy Systems Corp. of the U.S., possibly from 1984.

Trilogy is a two-year-old company founded by Gene M. Amdahl, one of the best-known entrepreneurs in the computer industry. The Cupertino (Calif.) company is now developing very large-scale IBM-compatible machines.

Sumitomo plans to establish a marketing company in Japan in 1984 jointly with Trilogy and I.C. Corp., a Tokyo computer software company. The joint venture, to be initially capitalized at ¥300 million, will specialize in marketing Trilogy machines. Maintenance will be undertaken by I.C.

Sumitomo will be Japan's second trading company to handle very large-scale computers after Mitsui & Co. which has a 35 per cent interest in Nippon Univac Kaisha, Ltd.

Sumitomo expects orders mainly from banks, research institutes and large enterprises.

Trilogy machines now under development are expected to have a processing speed several times faster than the currently available very large-scale machines, such as IBM's "3081-K," Fujitsu's "M-382" and NEC's "ACOS-1000."

Trilogy machines will be assembled in Ireland.

EC, Hitachi Cable ll supply phone cilities to TOT

ippon Electric Co. (NEC) Hitachi Cable Ltd. have n orders for telephone [illegible] of the Telephone ganization of Thailand OT).

NEC obtained a ¥13 billion er for digital electronic telephone exchanges, equivalent to ,000 circuits. Delivery of AX61s will start in June xt year and be completed in gust 1984.

Hitachi Cable has been arded a ¥5 billion order for ing 400 kilometers of cable, out two-thirds of the cable ll be procured locally.

These orders are a part of T's ¥73 billion five-year [illegible] project to expand the ephone networks in Bangkok.

Meanwhile, Nissin Electric of Kyoto has received a ¥4 lion order for transformer station facilities from the i electricity authority GAT). It is a full turn-key tract.

anyo extends battery tech. to Swiss firm

Sanyo Electric Co. has nsed its technique to manufacture lithium manganese oxide batteries to Renata A., a Swiss firm that makes teries for use in watches. e two have signed a 10-year ensing contract.

Renata, a member of Switzerland's Asuag group, plans to art production with Sanyo's chnique next year. The batteries will be incorporated in ega, Longines and other high-quality watches.

The Swiss company is the fourth in the world to introduce Sanyo's lithium manganese dioxide battery technology, following Varta Batterie AG of West Germany, General Electric Co. of the U.S. and Duracell International Inc. of the U.S.

Sanyo developed the technique in 1976. It now produces 2.5 million units a month.

NTT orders terminals for its INS plans

Nippon Telegraph & Telephone Public Corp. (NTT) has started ordering new-type digital terminals to be applied to its proposed all-round telecommunication network, called the Information Network System (INS), from Japanese suppliers.

NTT declined to specify the names of suppliers, but they are believed to be Nippon Electric Co., Fujitsu Limited, Oki Electric Industry Co., Hitachi, Ltd., Matsushita Graphic Communication Systems Inc., Mitsubishi Electric Corp., Sony Corp. and Toshiba Corp.

The amount of terminals ordered are less than five units each. But the order is significant as it is NTT's first purchase under the ¥25 trillion INS program.

INS is a system connecting the terminals with a communications processing center by means of a wide-band, high-speed digital carrier made of optical fiber cable.

A full-scale testing is scheduled to start in April next year.

NEC aims at increasing export of semiconductors 17 per cent

Nippon Electric Co. (NEC) plans to increase exports of semiconductors in the current 1982 business year, started April, by 17 per cent from the preceding year to ¥52 billion, it was learned last week.

Recovery in demand in the U.S. has made the Tokyo company aggressive toward export expansion again. Last year, the nation's largest semiconductor producer suffered the first "minus growth" in exports since it started shipments abroad in late 1960s. Its export value stood at ¥44.5 billion, down 5 per cent from the 1980 term.

The planned rate of increase for the 1982 period is modest compared to the 22 per cent and 40 per cent rises recorded in 1979 and 1980, respectively.

TH

Toshiba will double sales to Europe

Toshiba Corp. plans to double semiconductor exports to Europe in the current 1982 business term, started April.

The Tokyo company's semiconductor shipments to Europe in the preceding year were limited to ¥1.7 billion, accounting for merely 1 per cent of its total semiconductor sales, due mainly to a sluggish demand there.

In order to boost sales in Europe, Toshiba recently concluded business arrangements with two European firms — SGS-ATES of Italy and Plessey Co. of Britain.

SGS-ATES, which introduced Toshiba's highly-advanced microelectronics technology, will help Toshiba increase semiconductor sales in Italy.

Plessey has been marketing Toshiba semiconductors under its brand on an OEM (original equipment manufacturer) basis. Toshiba plans to increase the supply of semiconductors to Plessey to 20,000-30,000 units monthly by the end of this year.

Meanwhile, Japan's semiconductor exports to Europe in calendar 1981 dropped 12.2 per cent to ¥28.4 billion. The export value accounted for 3.6 per cent of Japan's total semiconductor production.

Hitachi, Toshiba & Mitsubishi Electric got good flow of orders in fiscal 1981

Three highly-diversified electrical machinery makers — Hitachi, Ltd., Toshiba Corp. and Mitsubishi Electric Corp. — enjoyed favorable orders in fiscal 1981. However, they are slowing orders for home electric appliances, while demand for heavy electrical machinery, telecommunications equipment, office automation (OA) equipment and semiconductors remained strong.

Orders for home electric appliances placed with Hitachi went up by 14 per cent in fiscal 1981 over the preceding fiscal year with Mitsubishi by 2.0 per cent and with Toshiba 5.2 per cent.

The low growth rates of Mitsubishi and Toshiba were attributed to sluggish rise in demand for "white products," such as refrigerators and washing machines, and particularly to failure in the sales campaign for air conditioners last summer and heating equipment last winter.

Yuichi Yamada, an executive of Toshiba, explained, "Deterioration in sales of audio equipment since last fall and the sluggish rise in demand for video tape recorders (VTRs) further aggravated the situation."

Hitachi, on the other hand, was able to mark a double-digit growth rate in receiving orders for home electric appliances because the company successfully carried out its sales campaign for VTRs. With Toshiba and Mitsubishi faltering in VTR sales, Hitachi took a step ahead of the two others.

With regard to heavy electrical machinery equipment, the demand for thermal power plants from foreign countries expanded briskly while domestic demand for power generation facilities remained sluggish. Hitachi received orders for six thermal power plants from Nigeria with a capacity of 200,000 kilowatts and two other power plants from Australia.

Because Hitachi received few orders for nuclear power plants in fiscal 1980, the increased rate of orders for heavy electrical machinery accepted by the company jumped to 22.3 per cent in fiscal 1981 over the preceding fiscal year.

Toshiba, on the other hand, registered a minus growth despite receiving so many orders in fiscal 1980 because the company had obtained contracts for the No. 3 nuclear power plant of Fukushima from Tokyo Electric Power Co. at the end of fiscal 1980, according to Yamada.

The increased demand for power facilities from overseas and increased plant and equipment investment by the private sector combined to keep push up the orders for heavy electrical machinery.

All three electric machinery companies received orders for the control system and other electric facilities aimed at economizing on manpower and energy saving. However, demand for some of the heavy electrical machinery such as elevators slackened on account of a recession in housing construction and public works.

The three companies share the view that orders for electronics / telecommunications equipment such as semiconductors, ICs, and office automation equipment expanded steadily and that there are no signs of downward trends in this field.

Toshiba had relatively small growth in orders received in this field because the company produced semiconductors and ICs mainly for home electric appliances. Hitachi and Mitsubishi were able to maintain more than a 20-per-cent growth rate in this field.

In the field of electronics products, all three companies enjoyed a 25 to 30 per cent growth rate in receiving orders for OA equipment such as computers, personal computers, mini-computers and word processors. Orders for medical electronics equipment slowed down, however.

Orders for OA-related equipment, as well as orders for semiconductors and telecommunications equipment, are likely to play a major role in boosting the business in the field of electronics products.

And yet, all the three companies are rather cautious about the flow of new orders in fiscal 1982. "There will be no major recovery in the home electric appliances in the first half of fiscal 1982," said Toshiba's Yamada.

Orders Received in Fiscal 1981 By 3 Highly-Diversified Electrical Machinery Makers

(In billions of yen)

	Hitachi	Toshiba	Mitsubishi
Heavy electrical machinery	[illegible]	[illegible]	[illegible]
Home electric appliances	[illegible]	[illegible]	[illegible]
Telecommunications equipment, OA devices & semiconductors	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]
(Orders from overseas)	[illegible]	[illegible]	[illegible]
Orders backlog as of March 31, 1982	[illegible]	[illegible]	[illegible]

Note: Percentage changes from fiscal 1980 in parentheses

TUESDAY, JUNE 22, 1982 — THE JAPAN ECONOMIC JOURNAL — [illegible] 9

Suwa Seikosha unveils first TV screen wristwatch in world

The world's first wristwatch with a black-and-white television screen was unveiled last week in Tokyo by K.K. Suwa Seikosha, a leading watchmaker in the Seiko group.

The TV watch has a 1.2-inch-diagonal liquid crystal display screen instead of a cathode-ray tube for ordinary TV receivers.

The Suwa, Nagano Pref.-based company plans to market it by the end of this year at a price of around ¥100,000 (approx. $400).

The watch, which has both the video display and digital display, is connected by a slim cable with a pocketable tuner (receiver). The tuner, measuring 78 x 140 x 18 millimeters and weighing 190 grams, can receive VHF and UHF TV programs and stereo FM broadcasts. A headphone is used for listening. The headphone plays the role of an antenna, too.

The TV watch provides a clear image even on a moving car or train, the company said.

The secret lies in a specially-designed large-scale integration (LSI) which controls a total of 31,920 imaging elements arranged 152 horizontally and 210 vertically.

Suwa Seikosha's achievement is expected to stimulate Toshiba Corp., Hitachi, Ltd., Matsushita Electric Industrial Co. and other consumer electronics makers which have been vying for development of a miniaturized TV.

Nippon Electric is slated to double output of small business computers

Nippon Electric Co. (NEC) will double production of small business computers and related equipment in the U.S.

The Tokyo company announced last week that NEC Information Systems, Inc., its wholly-owned subsidiary in Lexington, Mass., has started building a ¥2.7 billion plant in Boxborough, Mass. for completion by the first half of next year.

The 22,400-square-meter plant, to be set up on a 280,000-square-meter tract, will produce SBCs, small printers, personal computers and other related equipment.

NECIS has been producing SBCs at its plant in Woburn, Mass. since March. The recent surge in demand for SBCs has led NEC to construct a new plant. The plan calls for increasing the number of employees at NECIS to 500 from the present 200 and more than doubling output of SBCs, printers and other devices.

The group expects increased employment of local people would ease the Japan-U.S. bilateral trade friction.

NECIS's sales in the 1981 business year stood at ¥25 billion. The company hopes to boost sales to ¥45 billion in 1982 and further to ¥75 billion in 1983.

Seiko group will market computers in link-up with Science Management

The Seiko group will market small business computers in the North American market by teaming up with a leading U.S. computer software company, Science Management Corp.

They will establish in July a joint marketing company in Bridgewater, N.J. The new company, tentatively named SMC [illegible] Inc., will be capitalized at $5,052,000. SMC will put up 84 per cent of the capital, while the rest will be met jointly by K. Hattori & Co. (5 per cent), Seikosha Co. (10 per cent) and Tokyo Books Ltd. (1 per cent).

SMC [illegible] will market Seikosha's small business computers together with SMC's software. The joint venture will make the most of SMC's marketing routes in North America covering hundreds of computer shops.

This is the first instance of a Japanese hardware company teaming up with an American software firm in marketing computers in North America.

Ueda is named president of Burroughs in Japan

Burroughs Co., a wholly-owned subsidiary of Burroughs Corp. of the U.S., will strengthen its marketing of computers and business machines in Japan by promoting a Japanese vice president to the presidency.

[illegible] Ueda, [illegible], will be elected as president at the board of directors meeting scheduled for July 2. He will be the first Japanese president of

Joint venture will produce floppy discs

Mitsubishi Chemical Industries, Ltd. and Verbatim Corp. have agreed to make and market floppy discs, data cassettes and cartridges through their joint venture, Kasei Verbatim Corp.

Following such marketing by Verbatim Far East, the joint venture is slated to build a plant at ¥3 billion at Odawara, Kanagawa Prefecture, by early 1983.

Kasei Verbatim is scheduled to be set up in mid-July, with the ¥300 million capital equally put up by the two parents.

The initial year's sales are projected at ¥1 billion. Sales will go up to the ¥3-5 billion level annually two or three years later, when the joint venture's plant will be assembling the discs and other related products.

Floppy discs are magnetic memory media, with magnetic powders coated on polyester film bases. They are used in personal computers and word processors as memory devices.

The demand for the discs in Japan is estimated at ¥10 billion a year, but the chemical company anticipated it will grow to ¥100 billion only a few years from now. MCI aims at capturing 20-30 per cent of the disc market in Japan through production and marketing by Kasei Verbatim.

TDK also eyes production

TDK Electronics Co. will move into the floppy disc market in September, the Tokyo company announced last week.

Monthly production will be 200,000 discs initially. This will be boosted to 500,000 next year

Saudi orders transmission line jobs

Two Japanese companies have won Saudi Arabian orders to lay aerial transmission lines in the country's western region facing the Red Sea. They are valued at ¥29 billion in total.

The transmission lines will be extended from a 1 million-kilowatt thermal power plant to be built in Rabigh to Yanbu in the north and Jeddah in the south.

The northern 175-kilometer route, worth ¥15 billion, between Rabigh and Yanbu will be built by Fujikura Cable Works, Ltd. The southern 140-kilometer route, worth ¥14 billion, will be constructed by Sumitomo Electric Industries Ltd.

Construction will start this autumn for completion in April, 1984.

The thermal power plant in Rabigh will be built by Mitsubishi Heavy Industries, Ltd.

Hitachi sells large computers to U.S. company

Hitachi, Ltd. has won an export contract for its very large-scale computer, M-280H. This is the first order from abroad for the machine.

The Tokyo company last week announced conclusion of a contract with National Advanced Systems Corp. of the U.S. to export the M-280H machines.

NAS, a subsidiary of National Semiconductor Corp. of Santa Clara, Calif., will market the IBM-compatible machine in the U.S. under its own brand on an OEM (original equipment

Apple Computer establishes new office in Tokyo

Apple Computer Inc. of the U.S. has opened an office in Tokyo to prepare for the establishment of a wholly-owned subsidiary.

The Tokyo office will be officially responsible for all Apple product availability, sales, service and warranty on July 1. Apple products so far have been distributed in Japan by Toray Industries, Inc. since 1980.

William J. [illegible], Japan sales specialist of the Cupertino, Calif.-based company, has been placed in charge of managing the Japanese operation.

ELECTRICALS & ELECTRONICS

3 big elec. machine makers plan huge R&D spending

— Chiefly for electronics tech. —

Hitachi Ltd., Toshiba Corp. and Mitsubishi Electric Corp., three major highly-diversified electrical machinery makers in Japan, will spend a total of ¥300 billion in research and development in fiscal 1982, started this April. This is an increase of 11.6 per cent over the preceding fiscal year.

Although the increase rate is smaller as compared with the 14.9 per cent of fiscal 1980 and 18.5 per cent of fiscal 1981, the combined R&D spending will reach more than ¥300 billion for the first time. The three companies have decided to spend the large amount of R&D expenditures so as to keep in step with rapidly expanding technological innovations in the field of electronics, such as semiconductors and computers. Each company is likely to spend the equivalent of 5 per cent of the company sales for R&D.

Hitachi's research and development spending will amount to ¥150 billion, which accounts for half of the total R&D spending by the three companies. "We will make our R&D investment in a prospective field even if we have to get a loan," says Yasuo Miyauchi, a company executive of Hitachi.

Hitachi's R&D investment reached a ¥100-billion level for the first time in fiscal 1980 and has since been increasing at a rapid tempo. The company received ¥5.8 billion in technological fees but spent ¥8.9 billion for purchase of technologies in fiscal 1981, resulting in a ¥3 billion "in deficit."

"We hope to achieve a balance of income and expenditures in the research and development in the next five years or so," says Katsushige Mita, president of Hitachi.

Meanwhile, Toshiba is expected to spend more than ¥80 billion in the R&D investment during the current fiscal year, according to Yuichi Yamada, an executive of the company.

"We will carry out an aggressive business campaign based on development and innovation of electronic technologies in the future," says Shoichi Saba, president of Toshiba. The company will not spare investment in development of advanced technologies, according to Saba.

Mitsubishi has also increased its R&D spending to ¥70 billion from an originally planned investment of ¥60 billion for the current fiscal year so that the company will not be left behind Hitachi and Toshiba in development of next-generation technologies and new products.

"With the help of technologies in electronics, much more technological development will be made in the fields of heavy electric machinery products, home electric appliances and industrial electronic equipment," says Nihachiro Katayama, president of Mitsubishi.

R&D Expenditures

[illegible]

	[illegible]	80	81	82 [illegible]
Hitachi	[illegible]	[illegible]	[illegible]	[illegible]
Toshiba	[illegible]	[illegible]	[illegible]	[illegible]
Mitsubishi	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]

Sharp is going to invest ¥35 bil. in R&D projects

Sharp Corp. will invest ¥35 billion in research and development for fiscal 1982 from April, an increase of 24 per cent over a year ago, to promote fundamental research for semiconductors and bolster competitiveness of merchandise.

President Akira Saeki said that the company plans to employ 400 to 500 new college graduates every year in order to reinforce its research staff.

The R&D spending of the company continued to increase from ¥22 billion in fiscal 1980 to ¥28.2 billion in fiscal 1981. The ratio of R&D investment to sales is expected to go up to 5.2 per cent in the current fiscal year from 4.9 per cent in the preceding fiscal year.

Meanwhile, Sharp will spend ¥51 billion in plant and equipment expenditures for the current fiscal year (up 16 per

NIHON KEIZAI
(Top Play) (Full)

July 23, 1982

Development Bank to Extend Low-Interest Loans for Development of Advanced Technology; New System to Be Started from Next Fiscal Year; ¥10 Billion, First; 10 Some-Odd Cases Including Komatsu; Will Be Opened Also to Foreign Capital-Affiliated Enterprises

The Government has decided on the policy of inaugurating, from fiscal 1983, a system for low-interest loans by the Japan Development Bank in order to promote research and development of advanced technology by private circles, including biotechnology, at this time when the friction between Japan and the U.S. over the development of technology is intensifying. The Government judged that for Japan, which is a resources-poor country, working to perfect the research and development facilities for advanced technology with high added value will lead to the firming up of the basis of a country established on the basis of technology in the future. The loan conditions include the most preferential special interest rate of the Development Bank (7.3% per annum), and the rate of loans is 50 percent of the facilities construction expenses. The Government intends to extend loans amounting to some ¥10 billion in fiscal 1983, for the time being. Komatsu Manufacturing, Fuji Photo Film, etc., are already pushing plans for constructing research facilities for the development of advanced technology, and it is expected that these 10 some-odd cases will become objects of loans, for the time being. The Government intends to open this system to foreign capital-affiliated enterprises, too, to ward off the criticism by the U.S., etc., that it is a measure to protect and foster domestic industries.

Development of technology in the future is expected to move in the direction of "limits," "micro," "fineness," and "compoundness," and advanced research facilities compared with the research and development to date will become necessary. For example, the shield room to shield electric waves and electro-magnetic waves from outside is necessary for the research and development of electronics, and such research facilities as the germ-free room, and the artificial environment experiment room (fight-tron) to create various natural conditions artificially, are indispensable for the study of biotechnology.

The expenses for the construction of these research facilities amount to ¥1 billion to ¥2 billion, depending upon the scale of facilities, and there are many cases where it is difficult for enterprises to procure funds independently. When the future of business is not clear, investing huge amounts of money in research and development facilities is a big burden for private enterprises. There is also the fear that development of advanced technology will slow down due to restrictions in the field of funds.

Therefore, the Government has decided to establish a "system to extend loans to advanced technology research institutes" (tentative name) at a low interest rate, for the purpose of perfecting advanced technology research and development facilities, separately from ordinary facilities investments.

From fiscal 1965, the Development Bank extended low-interest loans to the establishment of research institutes by Fujitsu, Sumitomo Electric Industry, Kuraray, etc., in order to promote domestic technology. However, it discontinued the granting of loans for the establishment of research institutes in fiscal 1972, because demand had run its course. It has not yet extended special low-interest loans to facilities for the development of advanced technology.

Research and development investments by private circles are expected to amount to ¥545,700 million in fiscal 1982. It is expected that research and development investments including the development of advanced technology will increase from fiscal 1983, centering on the Tsukuba Study and Education City, the technopolis, etc. The Government wants to increase such a trend further through low-interest loans by the Development Bank.

The Development Bank is considering the following items as candidate projects for which it is to grant loans: (1) Development of liquid-phase epitaxial (material for optical semi-conductors), utilizing Japan Vacuum Technology's ultra-vacuum technology; (2) development of an opto-electronics material (substitute material for film) to change light to electricity, by Fuji Photo Film; (3) development of a material to dissolve cerebral thrombosis, by the Yakult Head Office; (4) polymide synthesis (heat-proof plastic) by Dainippon Ink Chemical Industry; and (5) development of robots by Komatsu Manufacturing. As research facilities, radition-connection experiment rooms, sound-free rooms, large-size structural experiment facilities, rooms connected with information processing, etc., are being considered.

It is expected that the following criticism will be offered by the U.S. Government in regard to such a low-interest loan policy for private enterprises: "The trade structure in the future will be distorted by the Government's fostering the research and development by private circles." The policy of the Government is to include foreign capital-affiliated enterprises among the objects of loans, under this system, in case they engage in research and development in Japan, in order to ward off such criticism.

NIHON KEIZAI
(Page 1) (Full)

Eve., July 23, 1982

Breaking of One-Percent Framework Cannot be Helped, If Economic Growth Becomes Dull; Clarified by Prime Minister SUZUKI

Prime Minister SUZUKI, in connection with the growing possibility of defense expenditures breaking the framework of 1% of the GNP during the 1981 Medium-Term Operations Estimate, clarified the position that it cannot be helped, if defense expenditures exceed the framework of 1% of the GNP, due to a dip in the growth rate of the GNP, saying that "if economic growth becomes stagnant, or if it dips, due to a world-wide depression, it is possible [for defense expenditures] (to break the framework of 1%)." Also, concerning a brake on defense expenditures, SUZUKI showed the view that "it does not mean that the steady carrying out of the Defense Plan General Outline will lift the brake." These statements were made in reply to questions asked by a group of reporters in the Diet Building.

JDA Director General ITO explained the outline of the 1981 Medium-Term Operations Estimate at the Cabinet meeting held in the wake of the National Defense Council meeting on the 23rd. In his explanations, in connection with the situation where defense expenditures cannot but break the "framework of 1%" of the GNP, during the period of the same Operations Estimate, ITO said that "the GNP, which is the denominator, changes, depending upon economic situations. When the fact that the scope of defense expenditures, which are the numerator, is also subject to changes, is taken into consideration, it cannot be said, at the present stage, that defense expenditures will exceed the one percent of the GNP due to the 1981 Medium-Term Operations Estimate." So saying, ITO officially clarified that at the present stage, he has no intention of changing the Government's policy on the "framework of 1%."

NIHON KOGYO
(Top Play) (Full)

July 28, 1982

MITI to Conduct Fact-Finding Surveys Concerning Motives for Purchasing IC's; To Give "Counter-Evidence" as to Misunderstanding; Micro-Computers of INTEL to Be Covered; Will Give Explanations at Japan-US Conference in September

MITI will soon carry out surveys, covering users, on their motives for purchasing IC's (integrated circuits). On the US side, there is the deep-rooted suspicion that MITI administration or the market mechanism to promote unfair sales competition is working in the background of the "extinction of the market," to the effect that U.S. products, which sold on the Japanese market, too, at first, become utterly unsalable at a certain time. This was brought up by the U.S. side even at the first meeting of the Japan-US Advanced Technology Working Group, which meeting was held in Honolulu recently. MITI strongly rebutted this, saying that "There is no such reality." The Ministry, thinking that it is necessary to clarify the live voices of users to eliminate the misunderstanding of the U.S. side, is to carry out surveys covering users, centering on their motives for purchasing IC's. The U.S. side has made Japan's advanced technological industry an object of attack, as can be seen from the IBM industrial espionage case and the suspicion that an export cartel as to IC memory was formed. However, MITI's policy is to give counter-evidence, one by one, as to the U.S. side's unilateral misunderstanding. The results of the forthcoming surveys will be presented to the second meeting of the Working Group, which is scheduled to be held in September.

MITI is planning to carry out surveys of users as to the 8080-type micro-computers produced by INTEL of the U.S., among IC's. At the recent meeting of the Japan-U.S. Advanced Technological Industry Working Group, they were taken up by the U.S. side as "market-extinction products" on the Japanese market, together with the U.S. CRAY Company's super-computers for scientific calculations.

8080-type micro-computers can be said to be the standard version of the 8-bit type. They were imported to Japan from about 1974. As to these, NEC, Toshiba, and Mitsubishi Electric merchandised products of the compatible type, one after another. The U.S. side's assertion is that for this reason, INTEL products, which held an overwhelming share at first, have come to disappear on the Japanese market.

It is an extremely rare case for MITI to carry out surveys as to specific products. However, it will boldly carry them out with the thought that if the misunderstanding on the U.S. side is left as is, it will inevitably promote the trade friction further in the future. In the surveys, the Ministry will ask questions centering on users' motives for purchasing IC's, including quality, the deadline for delivery, and prices, as to why the users, who used microcomputers of the 8080 type in the past, have switched to domestic products.

It is viewed that in the background of the U.S. side's emphasizing the "extinction of the market," there is the sense of distrust that there is the administrative guidance by MITI which forces unfair transactions as to foreign products and the market mechanism peculiar to Japan. Through the forthcoming surveys, however, MITI will present to the U.S. side, at the second meeting of the Japan-U.S. Advanced Technology Working Group, the following points as concrete facts: (1) There are no unfair transactions on the Japanese market; (2) the purchasing by users is decided by such purely economic factors as quality, prices, and the deadline for delivery; and (3) such cases can be said as a general view, not limited to the micro-computers which are to be subjected to surveys. It is rather scheduled to correct the posture of the U.S. side, conversely, as material to prove why U.S. products do not sell on the Japanese market.

[Excerpts from NIKKEI SANGYO SHIMBUN, August 25, 1982]

The New Technology Development Corporation decided on the 24th to commission the development of "High Speed Continuous Coating Technology for IC material" which is a research product of Toyo University's Professor Yoichi Murakami. The part which will get the commission is the Sumitomo Electric Industries. Its development period will be 3 years, and the development cost will be 360 million yen ....

The proposed new technology is designed to accomplish the coating process, which has been done so far by using precious metals such as gold and silver, by using aluminum with a high speed. The result will be a few steps forward from the existing technology in terms of production cost, precision, and reliability ....

The New Technology Development Corporation believes that once this technology is established, it will find a wide range of usage in the area of IC and LSI packaging, thereby contributing to the technological renovation of Japan's semiconductor industries.

(Summary)

NIKKEI SANGYO SIMBUN
October 21, 1982,
Page 1

Nihon Telephone & Telegraph Public Corporation reported that they would make an investment of

¥150,000,000,000 to develop an "intellectual computer", which can make an assumptions, predictions, recognition and also can learn and understand as well.

In order to pursue this development, they will encourage the study of human elements technology and psychology, and also the study of high technology fields to achieve this type of computer.

NTT has proposed the high-level information and communications system (INS) for the future. This type of computer would be an important part of the system.

NTT also reported its policy to open its information to domestic and foreign companies and to propose joint studies.

Concerning to this type of computer, IBM and Bell Institute have already started the studies. In Japan, MITI has also started a large project called "the fifth generation computer".

(Summary)

NIHON KEIZAI SHIMBUN
October 23, 1982
Page 1

Opening quotes from U.S. TV program and Mr. Hiroo Toyota who is the "godfather" of VLSI.

It is said that LSI can be developed most efficiently with speeds in multiples of four. Why then did the MITI study institute jump from 4-K RAMs to 64-K RAMs, the so-called VLSI.

"Although you cannot produce 64-K RAMs with the equipment for 16-K RAMs, you can produce up to 256-K RAMs with those for 64-K RAMs. The reason why Japan is leading the U.S. in the 64-K RAM field is that the MITI study institute considered this fact at the earlier stage." -- Hiroshi Toyota

Being urged by a proposal from NTT, MITI made a plan for LSI development under government and public cooperation. As a result, they agreed that NTT would be in charge of LSIs for communications and MITI for computers.

NTT has invested ¥80,000,000,000 on VLSI totally, and MITI assumed that its production would start in 1980.

"American people think that the semiconductor business is a venture business, and they don't try to think about producing cheaply and efficiently. In this point, Japan knows now to mass-produce high quality goods cheaply as in color TVs and VCRs -- Tomihiro Matsumura, NEC

On the other hand, especially at the semiconductor plants in Kyushu, quality control activities are advanced.

With cooperation of government and public organizations, and with a huge amount of investment, the VLS was developed in Japan. Then big electronic appliances companies took charge of production. That is the secret.

In software, Japan is behind, but will catch up. '

Return to Yoneyama

JAPANESE ECONOMIC JOURNAL

THE JAPAN ECON

INTERNATIONAL WEEK
NIHON KEIZAI SHIMBUN

TUESDAY, NOVEMBER 16, 1982

TOK

With Yen Climb

Foreigners resume large investment in bonds & stocks

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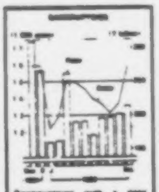
(Continued on Page 3)



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REACTION TO BREZHNEV'S DEATH

Economic exchanges with USSR may stay stagnant

A Nihon Keizai Shimbun Roundup

[illegible]

(Continued on Page 7)

NTT makes GaAs type of 1-kilobit static RAM

TK 11/26/82

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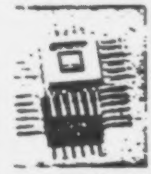

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GM will turn out 300,000 Isuzu cars under license

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1895
Times have changed
1982
SEIKO

Plans for undertaking overseas development of resources successively are being halted

[illegible]

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NTT –

(Continued from Page 1)

[illegible]

TH
11/16/82

The new Seiko Lassale.
Ranked among the world's
great possessions.

One would suffice. But Seiko Lassale is destined for those whose criteria are never compromised. Hence, a distinguished collection centered on a theme of priceless thin design and quartz technology. Here, in double metallurgy of gilt and steel. This is Seiko's proudest hour.

SEIKO
LASSALE

You get the best of Seiko only where you see this sign.

SEIKO

Initially 5,000 units monthly

Hitachi also will take up VTR prod. in W. Germany

[illegible]

News Briefs

[illegible]

Toshiba makes household use parabola antenna

[illegible]

Matsushita cuts into VTR broadcasting mkt

[illegible]

ELECTRICALS & ELECTRONICS

Oki will obtain LSIs from NEC, Hitachi and Toshiba

[illegible]

TH
11/16/82

Inmos sells cheap 16K RAMs

[illegible]

IBM Japan eyes full-scale output

[illegible]

Hitachi mass produces 64K E-PROM

[illegible]

TH
11/16/82

NEC will ship 256K RAM samples

[illegible]

Toshiba will boost 64K RAM output

[illegible]

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lectro-capacitance
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video disc format,
V. Philips' optical
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) format (electro-
stylus-method with
Japan. Pioneer
Corp. has been
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players since 1980,
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uta-JVC group and
group will vie for
es in the video disc
ket.

Electronics industry output in October drops

Production of the electronics industry in October fell short of the year-earlier level for the first time in four years and half since April, 1978, the Electronics Industries Association of Japan reported recently.

Production of electronic machinery and equipment and parts and components in October reached ¥907,264 million, down 0.9 per cent from the same 1981 month.

The prolonging "audio equipment recession" adversely affected not only household electronic machinery and equipment but also parts and components, the association said.

The October production value broke down into ¥304,564 million, down 10.1 per cent, for household electronic machinery, and equipment, ¥304,303 million, up 10.5 per cent, for industrial electronic machinery and equipment, and ¥298,397 million, down 0.7 per cent, for electronic parts and components.

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VTR Production in 1982

(1,000 units, %)

	1982		1981	
	Output	Share	Output	Share
VHS				
Matsushita	3,450	26.8	2,650	27.9
JVC	2,600	20.2	1,800	18.9
Hitachi	1,250	9.7	900	9.5
Sharp	950	7.4	650	6.8
Mitsubishi	400	3.1	300	3.2
Akai	300	2.3	150	1.6
Tokyo Sanyo	300	2.3	30	0.3
Total	9,250	71.9	6,450	68.2
Beta-Format				
Sony	1,900	14.8	1,700	17.9
Sanyo	1,250	9.7	870	9.2
Toshiba	500	3.9	400	4.2

ELECTRICALS & ELECTRONICS

IC exports in Nov. marked 47.1% gain over year ago

Exports of integrated circuits remain strong, although other electronic parts and components are faring poorly.

IC exports in November rose 47.1 per cent from a year before to ¥27,967 million, the Electronic Industries Association of Japan reported recently. IC exports during the January-November, 1982 period reached ¥255 billion, up 41.9 per cent from the corresponding 1981 period. The export performance in the 11-month period already has topped 1981's figure of ¥199.6 billion.

The association predicts IC exports in 1982 at ¥280 billion at least. The 40 per cent-plus gain contrasts sharply with the merely 8.9 per cent increase registered in 1981. Except for 1981, however, IC exports have been recording a double-digit gain. The estimated 1982 figure is about nine times larger than the ¥31.7 billion in 1977, indicating a 9-fold expansion in five years.

IC imports in November also gained 11.0 per cent to ¥12,103 million, EIA-J reported. IC imports during the January-November period came to ¥117.5 billion, up 13 per cent.

The big gap in the rate of increase between exports and imports greatly widened the IC trade surplus. The ¥137.5 billion surplus in IC trade during the 11-month period is almost double the ¥75.8 billion surplus in 1981.

Exports of discrete semiconductors, however, continued to be sluggish. They dropped 9.4 per cent to ¥5,416 million in November, bringing the January-November period performance to ¥63.9 billion, down 3.9 per cent.

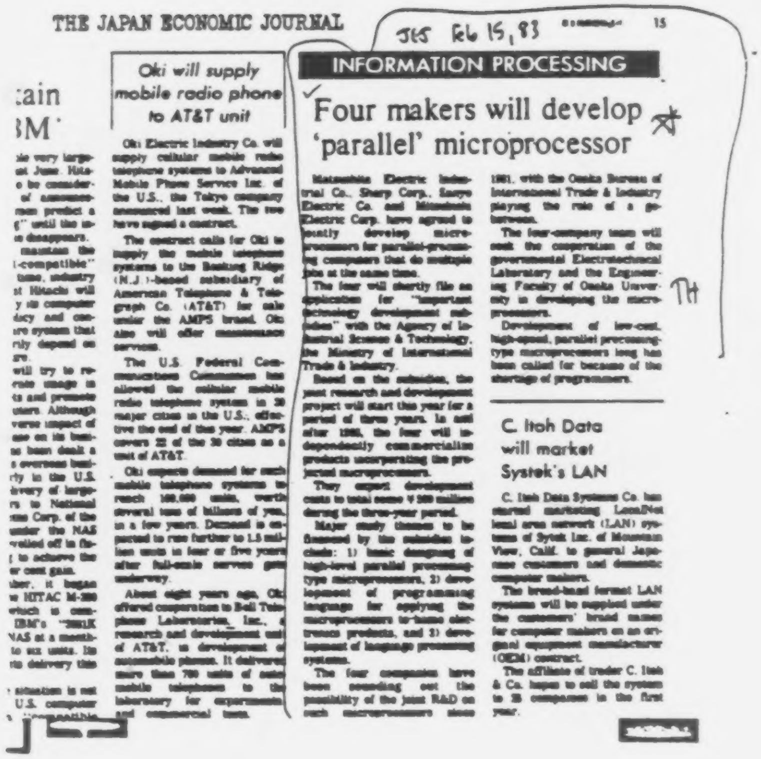
Sales to America shoot up by 62.6%

IC exports to the United States in November shot up 62.6 per cent from a year earlier to ¥12,059 million. IC shipments to the U.S. during the January-November period reached ¥104.2 billion, up 63.2 per cent, exceeding the ¥100 billion mark for the first time.

IC imports from the U.S. gained 17.2 per cent to ¥8,613 million in November, resulting in a ¥3,446 million surplus in IC trade balance in favor of Japan. IC imports during the 11-month period gained 21.6 per cent to ¥77 billion.

Japan's surplus in IC trade with the U.S. during the January-November period came to ¥27.2 billion, compared to the virtual equilibrium (a surplus of ¥500 million in Japan's favor) in 1981.

Industry men fear that such a huge surplus would stimulate the U.S. semiconductor industry and government. The Japan-U.S. IC trade friction is still smoldering. High-ranking officials of the U.S. Commerce Department have been repeating harsh criticism against Japan, and the Semiconductor Industry Association (SIA) has compiled a special report on Japan's semiconductor industry.



THE JAPAN ECONOMIC JOURNAL

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Oki will supply mobile radio phone to AT&T unit

Oki Electric Industry Co. will supply cellular mobile radio telephone systems to Advanced Mobile Phone Service Inc. of the U.S., the Tokyo company announced last week. The two have signed a contract.

The contract calls for Oki to supply the mobile telephone systems to the Basking Ridge (N.J.)-based subsidiary of American Telephone & Telegraph Co. (AT&T) for sale under the AMPS brand. Oki also will offer maintenance services.

The U.S. Federal Communications Commission has allowed the cellular mobile radio telephone system in 30 major cities in the U.S., effective the end of this year. AMPS covers 22 of the 30 cities as a unit of AT&T.

Oki expects demand for such mobile telephone systems to reach 160,000 units, worth several tens of billions of yen, in a few years. Demand is expected to rise further to 1.5 million units in four or five years after full-scale service gets underway.

About eight years ago, Oki offered cooperation to Bell Telephone Laboratories, Inc., a research and development unit of AT&T, in development of automobile phones. It delivered more than 700 units of such mobile telephones to the laboratory for experimental and commercial tests.

INFORMATION PROCESSING

✓ Four makers will develop 'parallel' microprocessor

Matsushita Electric Industrial Co., Sharp Corp., Sanyo Electric Co. and Mitsubishi Electric Corp. have agreed to jointly develop microprocessors for parallel-processing computers that do multiple jobs at the same time.

The four will shortly file an application for "important technology development subsidies" with the Agency of Industrial Science & Technology, the Ministry of International Trade & Industry.

Based on the subsidies, the joint research and development project will start this year for a period of three years. In and after 1986, the four will independently commercialize products incorporating the projected microprocessors.

They expect development costs to total some ¥300 million during the three-year period.

Major study themes to be financed by the subsidies include: 1) basic designing of high-level parallel processing-type microprocessors, 2) development of programming language for applying the microprocessors to home electronics products, and 3) development of language processing systems.

The four companies have been sounding out the possibility of the joint R&D on such microprocessors since 1981, with the Osaka Bureau of International Trade & Industry playing the role of a go-between.

The four-company team will seek the cooperation of the governmental Electrotechnical Laboratory and the Engineering Faculty of Osaka University in developing the microprocessors.

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Development of low-cost, high-speed, parallel processing-type microprocessors long has been called for because of the shortage of programmers.

C. Itoh Data will market Systek's LAN

C. Itoh Data Systems Co. has started marketing LocalNet local area network (LAN) systems of Sytek Inc. of Mountain View, Calif. to general Japanese customers and domestic computer makers.

The broad-band format LAN systems will be supplied under the customers' brand names for computer makers on an original equipment manufacturer (OEM) contract.

The affiliate of trader C. Itoh & Co. hopes to sell the system to 25 companies in the first year.

NIHON KEIZAI
July 2, 1984
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MITI ASSISTS WITH 30 BILLION YEN FOR 8 YEARS TO DEVELOP THE ULTRA-HIGH-TECH PROCESSING TECHNOLOGY PROJECT FROM NEXT YEAR

MITI designates the "Ultra-high-tech Procession Technology Project" as one of the "Large-Scale Industrial Technology Research and Development System" aimed to develop the grade of IC or precision instruments and also to manufacture high-functioned compound material by using ceramics. MITI makes a policy to budget 30 billion yen to develop the technology for 8 years. High-grade processing techniques are the basic techniques for development of high-tech industry. MITI aims to lead the competition in the world.

At the present moment, the U.S. and Japan are now at the top of the processing techniques for parts of the high-tech industry which bears 21 century like airspace, aircrafts and energy. In the U.S.A., there are several research projects controlled by the Pentagon and the DOE. Most objects of research are for military affairs. Therefore, the U.S. Government restrains the outflow of new processing techniques because of security reasons.

On the other hand, there are many developments of techniques by the private sector in Japan. At the present time, the Japanese processing techniques for parts for general use is at the top of the world. However, MITI understands that up-grading high-tech processing technique is a "MUST" to become the world leader in the high-tech development competition. Therefore, MITI will assist in developing the 3 areas of semiconductors, precision instruments and new materials which are the most popular for usage.

With reference to semiconductors, they will develop the grade of IC from 1 mega bit (1 mega is 1 million) to a couple hundreds of mega bits by using laser beams to make ultra-fine processes. Again with the reference to ultra precision instruments, they will try to develop the processing grade to 0.1 micron which is 100 times the present grade. (1 micron is 1/1000 mm)

NIHON KEIZAI
July 6, 1984
Page 3

THE MINISTRY OF FINANCE REFUSES MITI'S REQUEST OF SPECIAL FRAMEWORK FOR HIGH-TECH DEVELOPMENT FROM THAT OF ESTIMATE REQUEST LIMITS (CEILINGS)

The Ministry of Finance has concluded that it will refuse MITI's request for a special framework for high-tech development from MITI's budget of 1985. It is because under the financial reassessment situation, it is difficult to make new ceilings. Also, the Ministry of Finance judges that 1) the expansion of subsidies for industrial policy has the possibility to raise criticisms from abroad, and 2) the Japanese private sector has enough power to develop techniques and to raise funds by itself.

NIHON KEIZAI
July 31, 1984
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MITI SUBMIT "THE INDUSTRIAL STRUCTURE INVESTMENT COMMITTEE" A DRAFT OF "THE IMPORTANT POLICIES FOR 1985" AIMS AT "HIGH-TECH" AND "INFORMATION"

MITI decided to request an annual budget on 7 important items including technology development and promotion of information systems. Therefore, MITI submitted a draft to the General Committee of "The Industrial Structure Investment Committee" (Advisory Committee of MITI on the 30th. MITI urged that technology development is "MUST" for developing the Japanese economy and industry and drafted the establishment of a "Technology Development Foundation Adjustment Law" [tentative] which includes supporting measures for the private sector. Moreover, MITI suggested the establishment of an "Information Foundation Adjustment Law" [tentative] to promote an information system. MITI will receive the committee's decision on August 27, and will submit a request for a budget and prospective regulations to the Ministry of Finance and the Liberal Democratic Party.

The 7 items are 1) Technology Development, 2) Information, 3) Foreign Economic Policy, 4) Energy Resources, 5) Medium/Small sized Business, 6) Industrial Location, and 7) Related matter in regard to people's living conditions.

MITI especially aimed at high-tech development of New Material Biotechnology and Micro-electronics. And MITI submitted measures for increasing the research and development budget supporting measure for private sector to promote technology development, and plans for establishing a "High-Tech University" to their manpower. MITI sets forth the new regulation to promote these items systematically.

NIHON KEIZAI
August 2, 1984
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MITI POLICY: JOINT DEVELOPMENT IN HIGH-TECH BY GOVERNMENT AND PRIVATE SECTOR

PATENT RIGHT BELONGS TO BOTH THE GOVERNMENT AND CONTRIBUTED COMPANIES

Industrial Bureau of MITI decided on the establishment of a "Joint Cooperation Research System" in 1985. The Joint Cooperation Research System is to develop the high-tech fundamental area with the cooperation of the government research institute and private sectors. Nine institutions of the Industrial Bureau will accept researchers from the private sector to use high grade facilities and to introduce facilities from the private sector. Also, the patent right of joint research which belongs to the government now, will belong both to the Government as well as private companies which will joint the project. It will be a liberalization of Government patent practice towards the private sector.

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There are 9 institutions in Tsukuba-city consisting of the Machinery Technology Institute, the Electronics Technology Institute, the Science Technology Institute, the Textile High-molecule Material Institute, the Scientific-goods Institute, the Pollution Resources Institute, and the Geological Survey Institute. Prospective research themes are Radial Rays Applied Technology Institute, and New Material Development by using explosion systems at the Science and Technology Institute. These developments need expensive facilities, therefore, it is very difficult for the private sector to develop technologies by themselves.

The private sector will take charge of the entire technology development budget of joint development. However, the private sector will be able to use high-grade government facilities and man-power to develop high-tech fundation techniques which have a lot of risks technically and financially. MITI already started to ask private companies to join the project. There are many private companies showing their interests in the Applied Radial Ray Technology and New Material Development.

The patent right for joint research will be a co-ownership between the Government and the private sector. By authorization of the Government, a private company which will share the patent right with the government, will let other companies use the patent. Half of the royality (patent charge) will be a revenue for the Government to accumulate as financial resources for technology development.

As a present internal rule of the Industrial Bureau, when the private sector uses the Government facilities, there are so many complicated procedures that the Industrial Bureau does not acknowledge joint-research with the private sector. Even though there is allotment research or consigned research, the research facilities are not shared with private sector researchers. Moreover, these results are given Government patents. Cooperating companies can only get permission to use results. Therefore, the dissatisfaction among private sectors increased towards patent rights that are not shared with the private sector under the present rule.

For instance, there are so many cases of private companies establishing research groups with government control, like the ICOT which is now studying the Fifth Generation Computer Systems. These cases illustrate that the Government trusts the private sector to develop the research with Government budget or Government aid. The result from consigned research belongs to the Government, and the result from research by aid belongs to private sector, however, both situations are not joint-research.

MITI will study carefully in the areas of 1) Joint-research theme should have technology which can be made public, 2) there should not be any inequality in selection of participating companies. MITI wants to conclude the plan for 1985 before the end of this year.

NIHON KEIZAI
August 3, 1984
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MITI POLICY: PROMOTES HIGH-TECH JOINT DEVELOPMENT

REORGANIZES "JAPAN INDUSTRIAL TECHNOLOGY PROMOTION ORGANIZATION" FOR THE WINDOW

MITI has made concrete plans for reconstructing and expanding the "Japan Industrial Technology Promotion Organization" (Chairman: Mr. Kenichiro Komai, Advisor of Hitachi) to promote high-tech development. It will be a specially authorized corporation established by the MITI minister in conformity with the "High-tech Development Foundation Adjustment Law" which MITI is hoping to pass at the next Diet. It's function is to provide low interest finance and subsidy assistance for high-tech development by private companies. Also, it will be a Government "window" for the joint research by the governmental research institute which is controlled by the Industrial Technology Bureau, and private sector. Moreover, MITI is planning to use it or management of "Japan Trust" (Tentative) which MITI is planning to establish to invite foreign researchers.

MITI aims at promoting technology development as a new policy for 1985. Therefore, MITI aims at establishing a core organization for policy. At the early stage, MITI studied the establishment of a special organization which has the same managing function as the New Energy Development Organization (NEDO). However, it is very difficult to establish a new special organization under the present administrative conditions. Therefore, MITI will change the strategy to expand presently established organizations.

The "Japan Industrial Technology Promotion Organization" was established by government subsidies and donations from private companies in 1969. Its present function is receiving of technical investigation from MITI and the window for providing the result of research by the Industrial Technology Bureau to private industry.

By establishing the new law, MITI will establish the foundation of the organization to manage and finance a research trust as a proxy of MITI. Moreover, the organization will collect donations from private companies to strengthen the financial resources and become the technical development promotion/adjustment organization jointly co-financed by the Government and private sector.

NIKKEI SANGYO
August 10, 1984
Page 1 & 5

OKI AMERICA ENFORCES LEGAL POLICY TO AVOID HIGH-TECH FRICTION

Oki Electric Corp. has enforced a legal policy for Oki America to avoid high-tech trade friction which might come up by increasing imports to the U.S.A. Oki Electric has invited a well-known lawyer to Oki America as a part-time board member, and Oki Electric will make contracts with several law firms which have a strong background of actual situations as dealt by institutions of the American Government, like the ITC, DOC, etc. They will aim at gathering detailed information and opinion frm U.S. Government and industrial specialists to avoid trade problems by exports and to continue stable exports.

The part-time board member whom Oki Electric invited, is an outstanding lawyer who was active in buying "Walter E. Heler Corp." for the Fuji Bank. Oki Electric asked for his appointment for receiving advice from a broader point of view. Oki also expects concrete advice to avoid friction between American private companies, industry, and the Government.

Oki is also making contact with law firms which know the inside mevements (trade and tax, etc.) of supervisory government agents, i.e. the ITC, DOC, FTC, DOT. Oki will sign contracts with several law firms shortly. These decisions are based on the judgement of well versed knowledge and experiences of American law and customs which are very important for avoiding friction.

The enforcement of legal policy is because Oki has rapidly increased its export rate in company's operation, especially the rate of export to the U.S.A. Also, total Japanese exports of computer and communication equipment to the U.S.A. has increased dramatically, therefore, there are some strong views in the industry that the high-tech goods might become the target for U.S.-Japan trade friction issues.

Page 5 [Explanation]

Oki Electric will enforce its legal policy in the U.S.A. Not only in increasing the rate of producing goods in the U.S.A. but also in enforcing legal policy to avoid trade friction is getting industry's attention as a new movement.

Taking situations of AT&T's separation and the OA boom, Oki Electric's increase in exports to the U.S.A. is centered on the compact printer and automobile telephone. The 3-year-export ratio has increased from 12% to 30%. Exporting countries also have changed from under-developed countries to the U.S.A. Therefore, if the U.S. will start to regulate imports, Oki will run into difficulties on its operation.

Also, the movement for regulation over foreign communication equipment imports by Senator Danforth, becomes very active in these days. Therefore, the high-tech industry will need to make moves to avoid trade friction policies. Four years ago, Oki America was investigated by the ITC when the ITC investigated the dumping issue over Japanese-made semiconductors. The result was a conclusion that no dumping was present. But, Oki had experience that once they are involved in trade investigation, it will cost a lot to make reports to submit to the ITC and to negotiate with the ITC. No matter what the result is, it will definitely damage operations.

Therefore, Oki will increase production of goods in the U.S.A.: "We will drop the additional value in the U.S.A. for surviving in the U.S.A." On the other hand, they judged the importance of consideration of export price and cost and be cleared from doubts on dumping and cartel issues. It will therefore enable Oki to enforce a legal policy in the U.S.A.

NIHON KEIZAI
August 10, 1984
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Miti Requests 1,000 Billion Yen "High-Tech Tax Deduction" Promotes Venture Investment Increases Research Deduction Special Measure for Equipment

MITI has determined to request a "High-Tech Tax Deduction" system at the Tax Reformation, and made the outline of it on August 9. It aims at backing up technical development by private companies through Tax concessions: The outline is 1) to expand tax deduction measure for increasing the budget of research by private companies, 2) to authorize tax deduction or special treatment when a private company installs manufacturing facilities of new materials or electronics for promoting high-tech development, and 3) to reduce tax for profits from stock-sales of venture capital to increase venture investment. MITI estimates about 1,000 billion yen from tax deduction.

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The reason that MITI has determined to request a "High-Tech Tax Deduction" is because it concluded that, compared to other countries, Japanese tax burdens are heavier than other countries. And the heavy tax burden makes the private sector hesitate to invest on research and development as well as delaying maintenance of the facilities. MITI is concerned that if the situation continues like this, Japanese international competitive power will decrease. According to an investigation done by the

Keidanren, Japanese companies' actual tax burden rate is 51.57% (as of 1984). It is much higher than the U.S. (32.38%, as of 1985) and England (18.06%, as of 1982).

The remarkable point of MITI's Tax Deduction Plan focuses on research and development. First of all, MITI will apply the Tax Deduction Plan to expand the present Tax Deduction system. The present Tax Deduction system is applied when the private company increases its research budget. MITI plans to increase present deduction rate of 20% of that of 30% in principle. Also, MITI examines a new deduction rate of 50% on expansion of both research budgets for fundamental research and new material development. MITI tries, also, to amend the standard of Tax Deduction system. The present standard of Tax Deduction system is that the private company can apply the Tax Deduction system only when its research and development budget exceeds the highest amount of the past. MITI tries to mitigate it to the same standard as the American one: The private company can apply the Tax Deduction system when its research and development budget exceeds the average of past 3 years. Moreover, MITI tries to increase the limit of tax deduction from 10% of corporate tax to 20% of it.

When a private company installs equipment and facilities research and development, they will be authorized a new special measure for tax deduction. The special measure is a 50% deduction on the equipment/facilities bill and a 30% deduction on industrial adjustment for fundamental technology like new material, electronics, and biotechnology. The tax deduction is up to 7% for test and research equipment and machine or necessary facilities for fundamental technology development.

Also, the tax deduction includes a scheme for a 30% special deduction or 7% of tax deduction when the private company installs 1) the facilities for making a computer net-work, and 2) the facilities for making a high-tech managing function like industrial robots or NC industrial tool and machinery.

For promoting venture business, they will not apply a corporate tax (leading companies, 43.3%, medium/small size companies, 31%), on capital gains by investment on venture business. MITI applies 10% tax deduction on it.

MITI estimates 1,000 billion yen from tax deductions by the high-tech development promotion tax system. However, MOF will promote to reduce special measurements on tax because of financial difficulties. Therefore, MOF does not like to authorize the establishment of the new organization. There will be difficult negotiations on High-Tech Tax Deduction system between MITI and MOF until the Tax Reformation will be settled at the end of this year.

MAJOR REQUESTS OF HIGH-TECH DEVELOPMENT PROMOTION TAX SYSTEM

ITEMS	OUTLINE	OBJECT
(Amendment) *Tax Deduction Rate on increasing test and research fee	*20% (present) to 30%	*when the amount exceedes by the highest amount of past years to when the amount exceedes by the average of past 3 years
*Tax Deduction limit on increasing test and research fee	*10% of corporate tax (present) to 20% of it	
(New Role) *Promotion Tax on High-tech Development Investment	*30% of Investment sum as Special Concession or 7% of tax deduction (10% for medium/small business)	*For facilities, equipment and machinery for new material, electronics, biotechnology, and industrial robot and tool & machinery for NC
*Research & Development preparatory fee system for medium & small sized companies	*30% of research and development fee	*General reserach and development
*Venture Capital Special Treatment System	*20% of separation tax on profit from stock sales	

NIHON KEIZAI
August 13, 1984
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MITI POLICY: "HIGH-TECH FUND" IN COOPERATION WITH PRIVATE COMPANIES

SUPPORTS TECHNICAL DEVELOPMENT

SCALE OF 100 BILLION YEN: NO INTEREST LOAN/SUBSIDISE INTERESTS

MITI is planning to establish a "High-Tech Fund" (tentative name) to raise funds for the promotion of technical development which is MITI's major policy for 1985. The scale of the Fund is about 100 billion yen to be raised by joint financing by the government, Japan Development Bank and several private companies. Through the High-Tech Development Promotion Organization which will be established at the same time, the "High-Tech Fund" will finance no-interest loans to the research institute. Also when private companies rent capital for research and development from other monetary institutes, the "High-Tech Fund" will guarantee loans and subsidise interests. MITI will aim at including it into "High-Tech Foundation Adjustment Law."

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MITI GAVE UP "SPECIAL ACCOUNT PLAN"

MITI has determined that the promotion and the expansion for technical development in high-tech areas of micro-electronics, new material, biotechnology and robotics, are indispensible for establishing the new industry's foundation. MITI proposes to create the "High-Tech Development

Foundation Adjustment Law" and establish a "High-Tech Development Promotion Organization" in conformity with the Law. Then, MITI intends to promote technical development as well as support private companies' research and development through special concessions on tax by establishing a "High-Tech Tax Deduction" system.

MITI understands that promotion and expansion needs not only special treatment on tax but also special treatment on financial support and capital aid. However, the special ceiling for high-tech development in MITI's budget allocation proposal of 1985 was rejected by the Ministry of Finance (MOF). Also, "The Special Account Plan" which MITI examined as the most secure financial measure, could not guarantee the capital, therefore, MITI had to give up the plan. As an alternative plan, MITI decided to establish the "High-Tech Fund."

The "High-Tech Fund" is co-financed by the Japanese Government and several private companies. MITI will raise funds by reducing its budget (excluding the budget for technical development) and use it as Government financial resources for the Fund. JDB will also finance. Regarding the present "JDB Act," a financing function is not included. Therefore, under the present JDB Act, the JDB will not be able to finance it. Hence, the new JDB Act will include a financing role. JDB will use its own-capital (664.4 billion yen) as the financial resource. Each industry will manage to raise contributions from the private sector. MITI will collect contributions from the Electric-appliance industry, Iron and Steel industry, Automobile industry, Chemical industry and the Medical industry, etc.

The "High-Tech Fund" will take charge of financial matters and the "High-Tech Organization" will take charge of the research and development area. The "High-Tech Organization" will also promote cooperate research with private companies in areas of key/applied research and which are risky for private companies to develop by themselves. The organization will also evaluate new technology and new materials, accumulate technical information, and exchange techniques. Also, MITI is planning to establish a research institute and a research company for individual study areas under the "High-Tech Organization" and entrust research to them.

The "High-Tech Fund" provides capital to "The High-Tech Organization," back up the research institute or research company financially, and guarantee or subsidize the interest when a private company takes a loan for research and development. When the High-Tech Fund finances a private research institute/organization, a no-interest system will be applied. And when the research is carried out with successful results and items are produced for business, the "High-Tech Fund" will apply interest rates at special JDB rates (7.1% as of now).

MITI is also examining the joint organization which has both functions of research and finance. However, according to MOF's authorization, the MOF has a rule of "Scrap and Build" for establishment of new organizations. MITI will examine the "High-Tech Fund" even though it cannot establish a new organization. MITI will also examine the possible expanding of functions of the "Japan Industry Technology Promotion Organization" similar to the "High-Tech Organization" as an alternative plan.

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August 15, 1984
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MITI POLICY: "LARGE SCALE PROJECTS"

TARGET ON HIGH-TECHNOLOGY DEVELOPMENT

THE THREE PROJECTS ON SUPER-PRECISION PROCESSING TECHNOLOGY, ETC.

MITI has determined to select three themes for the "Large-scale Industrial technology Research and Development System" (so-called "Large Scale Project") which MITI starts to work on from 1985. These three projects are: 1) An Inter-operable Database System which enables the exchange of data between different database systems, 2) Aqua-Renaissance 90 which is the water recycling unit system by using biotechnology, and 3) Super-precision Processing Technology which aims at utilizing energy beams, widely applicable to semiconductor manufacturing. It is very unusual to raise three projects at the same time. From this point, we can see MITI's strong ambition for high-tech development.

MITI will raise 20 million yen as a research and preparatory fee for each project in 1985 budget. However, a total sum of 60 billion yen for three projects is necessary to complete development in the next 6-10 years. Therefore, there are some predictions that the negotiations between the Ministry of Finance (MOF) will be somehow be difficult, concerning the "Future Burden."

MITI takes the development promotion of high-tech as the top priority for its new policy of 1985. Therefore, aobut 30 prospective project themes were submittd. Regarding the importance of technology, MITI has decided on three themes. In the past few years, only one project for each year was selected. Three projects at the same time was a very drastic decision. The final decision will be made by the Technology Development Sub-committe of the Industrial Technology Council which will be held on August 24.

The Inter-operable database system is the one which unifies information from different databases. Using this system, the user can receive information from any database. The database is a very wide information system which includes voice as well as video information. MITI estimates 20 billion yen for the next 7 years to develop mainly, software for the system.

The Aqua-Renaissance is a system of processing and purifying waste water by development of bio-reactor using microorganism. MITI estimates 13 billion yen for the next 6 years to develop the system.

The high precision processing technology project aims at establishing applied technology through laser-beam and high-energy beams. Through this develoopment, MITI aims at establishing the fundamental technology for high-tech, like ultra fine-processing which draw wiring system for super LSI and ultra precision processing which cut/chip new materials. MITI estimates 30 billion yen for the next 8 years for it.

The "Large Scale Project" is the scheme which concerns joint-develoment with the private sector for urgent necessity of technical development and will have a direct impact in the near future in industry. The project has promoted about 20 schemes, such projects involving jet engines and supercomputers. Because of the budget shortage, MITI has applied the "Scrap and build" system to engage only on one project per year.

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NIHON KEIZAI
September 14, 1984
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Promotes Joint-Research by the Government and Private Sector "Technology Development Organization" Includes the Measure of Inviting Foreign Researchers

MITI has made concrete measures for a "High-Tech Development Organization" ("High-Tech Organization-tentative name) on September 13. According to the measures, in addition to Investment/Finance Business, the operational functions will include 1) Joint Research Promotion business which will promote joint research by governmental research institutes and private companies, 2) Japan Trust business which will invite foreign researchers by using private companies' capital, 3) Research Information Circulating business which will examine the diffusion method of research results/information held by the Government Research Institute to private companies, and 4) Test Evaluation Promotion business which will examine adjustment policy for the test-evaluation system. MITI will give wide operational functions to the Organization to promote the technical development policy which is the most important one.

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The Organization will be established in conformity with the law of the "High-Tech Development Foundation Adjustment Act" which MITI will submit at the next Diet. The major business of the Organization is related to "Investments" and "Loans" to companies which work on research and development of high-tech, like microelectronics and new-material. With reference to loans when the research is carried out with successful results, 7.1% (annual) interest will be applied, but when the research fails, a no-interest system will be applied.

In addition to this, four other functions are added. The Joint Research Promotion business: nine government research institutes controlled by the Industrial Technology Bureau, will invite researchers from private companies for joint research by using government high-grade equipment.

The Japan Trust business: the Organization will take charge of the foreign researcher invitation plan and its "windor." The operational fund will be raised by contributions from individuals and corporations.

In addition these will be a Research Information Circulating business and a Test-evaluation Promotion business which manages quality control. The Organization has five different business areas. MITI explains that the private companies will not be able to operate broad business areas and the object is to use the private companies' power. Also, MITI emphasizes that the establishment of the Organization will go along with the concept of the Government policy. The staff of the Organization will consist of 37 people including board members. Also, the Organization will establish a committee of specialists to discuss technical evaluations for loans and finances.

NIHON KEIZAI
September 15, 1984
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Six Major Points on Budgetary Allocation (4) the Establishment of a High-Tech Organization

(The very beginning)

In MITI's budget ceiling proposal for a Financial Investment Plan in 1985, MITI requests the JDB to "invest" 8 billion yen for the establishment of a "High-Tech Development Promotion Organization" (so-called the "High-Tech Organization").

The High-Tech Organization is the reorganization and expansion of the Japan Industry Technology Promotion Organization. It will finance with no-interest loans and provide financial aid to support technical development by private companies. According to MITI, the sum of 8 billion yen from the JDB is much smaller than the sum of other Ministries' requests, such as increases subsidies (170 billion yen) to the Housing Finance Corporation, or Long-term Bond Repayment by National Railways (124.4 billion yen). However, the matter which MOF is concerned about, is not the amount of the sum. MOF is concerned that instead of asking the JDB to "finance" (loan), MITI will request the JDB to "invest" which is illegal under the present JDB Act.

The first MITI plan was that MITI will raise the budget for the new organization by the technical development budget of the General Account: MITI requested the separate ceiling in the technical development budget to increase the budget for the new organization, at the end of July. Mr. Okunogi, the MITI Minister, raised the subject of the separate ceiling to increase the budget at Science and Technology Committee in April. But MOF's Financial Crisis Campaign was strong and MITI's separate ceiling request was rejected.

(MITI's Objection)

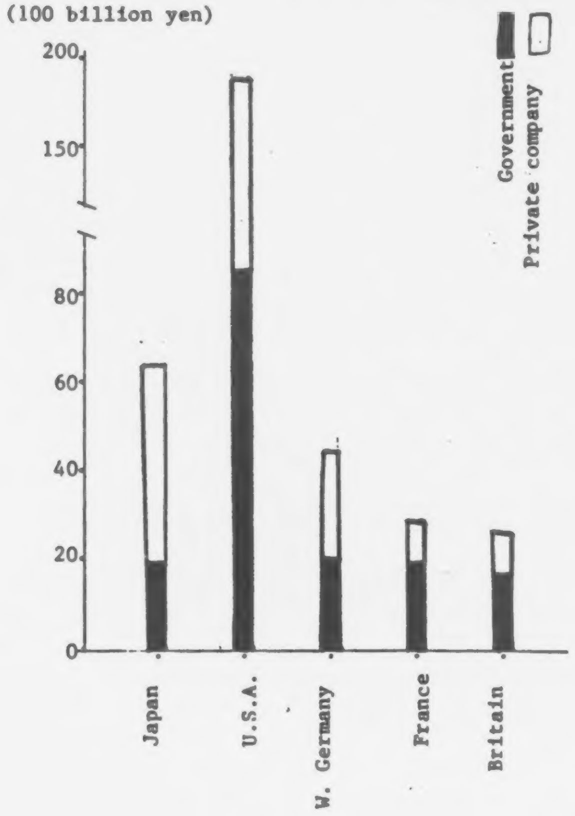
MITI maintained its opinion, that was an emergent escape measure, MITI requested the JDB Investment. Also MITI added that the High-Tech Development Foundation Adjustment Law (so-called the "High-Tech Act") which MITI is hoping to pass as a bill at the next Diet, includes the special role for JDB's Investment. Therefore, there is no institutional problem.

On the other hand, MOF objects to MITI's request and says that it is actually a request for a ceiling. Also, MOF adds that they do not know whether it is necessary to establish a new organization which will support productive leading companies. MOF has taken the precaution that if the profit from New NTT stock-sales goes to the General Account in 1986, MITI might raise the separate ceiling issue to raise the budget next year again.

(Future Prospect)

Budget allocation and drawing up a "High-Tech Act" will go on at the same time. MOF will protest a "High-Tech Act" to include the establishment of a new organization, financing and systemizing JDB's Investment. As a final analysis, the establishment of the "High-Tech Organization" and the JDB Investment will not be authorized. MOF and MITI will settle it by mutual concessions. They will probably compromise and take an alternative plan for expanding the business function of the Japan Industry Technology Promotion Organization and of permitting no-interest loans/finances to private companies. MITI will receive a 5-6 billion yen finance (loan) from the JDB to use it as financial resources for use as no-interest loans or for financing.

RESEARCH AND DEVELOPMENT BUDGET IN WESTERN COUNTRIES



Nihon Keizai
September 15, 1984
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予算編成 6つの焦点 ㊤

ハイテク 新機構の設立

そもそも通産省は六十年度の財政投融資計画の概算要求で、新設する特別認可法人・産業技術研究促進機構（仮称、ハイテク機構）へ日本開発銀行から八十億円の出資を求めた。

ハイテク機構は、現在の財団法人日本産業技術振興協会（会長、[illegible]一郎氏）を改組・拡充して、民間企業の技術開発を支援するため、無利子の融資や出資をしようというものだ。

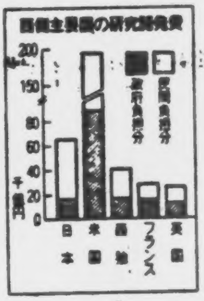
財投からハイテク機構への出資金の八十億円という金額は、住宅金融公庫への財投資金の追加増分（千七百億円）や国鉄の長期債務返還額（千二百四十四億円）などに比べれば「取るに足りないようなもの」（通産省）。しかし、大蔵省が問題にしているのは、金額の大小ではなく、通産省が財投融資を要求せずに、現行財政法では認められていない「出資」を求めたという点だ。

通産省は七月末の概算要求書で、一般会計の技術開発予算に別枠増額を認めてもらい、その分を新機構への出資にあてる方針だった。小此木通産相は八月下旬の科学技術会議でいち早く別枠要求をぶち上げた。ところが結局、大蔵省の財政再建キャンペーンの威力が大きく、別枠を認められなかった。

いいぶん　そこで通産省は「財投資金的性格として開銀出資を求めた」と言う。次の国会で制定をめざす「研究技術開発促進機構設置法」（ハイテク法）で開銀出資の仕組みを規定するから制度上も問題はない、という。

これに対し大蔵省は「事実上の別枠要求で、前代未聞だ」（主計局）と反発。「もともと有力である日本の大企業を重ねて補助しようような新機構がはたして必要なのか」ともいう。六十一年度の一般会計予算で、六百億円程度の日本電信電話株式会社の株式売却益が歳入として計上されることになれば、通産省がこれを財源にあらためて新機構への出資要求分として別枠を要求してくるのではないかと警戒している。

どうなる　六十年度予算の編成作業と並行して、ハイテク法案づくりが進められる。大蔵省は法律に新機構の設立、出資者などが規定され、開銀出資が恒久化することに強く抵抗していく方針。最終的には、ハイテク機構の設立や開銀出資は認められず、代わりに日本産業技術振興協会の事業を拡充して、民間企業への無利子融資や出資を認め、その財源として開銀から五、六十億円を融資することで決着する公算が大きい。



（注）①日、米、仏は1982年。西独、英は81年②国防研究費を含む

NIHON KEIZAI
December 28, 1984
Evening Paper
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NEW HIGH-TECH ORGANIZATION

BUSINESS OPERATION BUDGET: 4 BILLION YEN
CAPITAL: 9 BILLION YEN

The outline of the special authorized corporation for technical development and promotion, was concluded by negotiation between the Government and the LDP in the morning of December 28.

Contents of the outline are 1) the name of the organization is "The Basic Technology Research Promotion Center"; 2) the capital is 9 billion yen: 3 billion yen from the Japan Development Bank (JDB) and 6 billion yen from the Industrial Investment Special Account; and 3) the operation budget for 1985 is 4 billion yen: the Industrial Investment Special Account finances 2 billion yen, and loans 2 billion yen, etc. The official decision will be made by negotiation among three Ministers of MITI, MOF and MOPT in the afternoon of Dec. 28.

Regarding issues of establishing the "Industry Technology Center" requested by MITI and the "Electric Communication Promotion Organization requested by MOPT, they have already been concluded at negotiations between the Government and the LDP on the 21st: 1) By unifying two plans, the special authorized corporation which will aim at research for high-tech development and electric communication promotion, will be established, 2) dividends of the New

NTT's stocks which is the Government share (1/3 of whole New NTT stocks) will be applied for the operation budget after 1986; 3) the operation budget for 1985 will be funded from the Industrial Investment Account.

There were several discussions regarding the actual picture of the new organization among MITI, MOF and MOPT. As a result, words of "Basic Technology" and "Center" were added to the name because it is the precaution to avoid U.S. and other foreign countries' criticism of promoting a specific industry.

Regarding the operation budget for 1985, MITI and MOPT requested 15-20 billion yen which is equivalent to the dividend of New NTT stocks after 1986. But, by negotiation with MOF, it was concluded 13 billion yen would be provided which was the total amount of basic property and operation fund.

Also, the issue of finance from the JDB which was MITI's strong request, was approved. The JDB will finance 3 billion yen to the Center. The present JDB Act does not permit JDB to finance. Therefore, the Government will change the JDB Act or the Government will include the statement about the JDB's finance in the new Act for establish the new organization.

The main business of the new organization will be the finance, low-interest rate loans, and no-interest loan with conditions attached (when the research development does not bring successful results, no-interest policy will be applied) to the Venture Business which aims at research and development.

Regarding the distribution of the budget after 1986, Minister Sato, Minister of MOPT, stated the following at the press conference on the 28th: It depends on what type of project will be operated. However, as a basic 1) the revenue from the dividends of New NTT stocks, will be appropriated for the basic technology research project, relating to electric communication which the Ministry of Posts and Telecommunication will take responsibility for, and the technology development project for which both Ministries will take responsibility; 2) the initial capital from the Industrial Investment Special Account, will be appropriated for the technology development project for which MITI will take responsibility; 3) the finance from the JDB will be appropriated for research development projects for which both Ministries will take responsibility.

Miti intends to request equal basis for the financial distribution.

NIKKEI SANGYO
January 4, 1985
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(B) CATCHING UP LEGAL PROTECTION DELAY IN OWN OFFENSIVE COUNTERMEASURE

With increasing U.S.-Japan high-tech friction, Japanese computer companies are secretly studying one particular law. It is the U.S. 1930, Tariff, Sec. 337 (Unfair Competition). Originally, it was enacted to apply to cases of the infringement of patent rights. However, because of the obscure meanings of "unfair competition," it has expanded its application limit recently. There are so many recent cases in which this law was applied as a trump-card for legal protection, (the legal division of leading company). Companies noticed that it was very dangerous for them.

After 1983, the Japanese products which were involved in lawsuits by this law, were micro-processor, printers for computer, automatic finger-print inspection system, and optical-fibers, etc. Everything was a high-tech product. Once the company was involved a lawsuit by this law, the company has to spend tremendous legal fees to defend. Moreover, "Customs Exclusion Orders" will be issued. It is quite a strict law for defendents. Therefore, it cannot be ignored.

ALONG WITH LEGAL PROFESSIONALS TO MAKE CONTRACTS

Japanese computer companies will try to change employees' business consciousness, and to instruct "legal protection."

Mitsubishi Electric Co. which was paid expensive "tuition" by an IBM Spy Incident, made an order that high-tech information gathering activity should be consulted with the legal division. Whenever a company makes a contract with specific company of consulting company in Japan and abroad, legal staff or corporate lawyers who deal with high-tech area, go along with the technical staff. It is because they try to avoid unnecessary friction and business loss caused by their ignorance of legal aspects and contracts.

The Mitsubishi Electric Co. doubled its legal staff to about 10 people in 2 years time, and established the High-tech Group which follows the new regulation or protection case relating to intellectual proprietary, such as software, abroad. Mitsubishi receives foreign legal information, and amendments from its corporate lawyers in the U.S.A. and Europe. The legal staff analyzes this information clearly, and circulates it within the office. In short, Mitsubishi has enforced the function of preventive law.

AFRAID TO BECOME PASSIVE IN BUSINESS

Mr. Katsushige Mita, President of Hitachi Co., suggested the meeting of a foreign law seminar for technical staff at the division chief level. About 120 staff members have attended the seminar already, and more than half of them are technical staff for computer design and development. According to the spokesman from the legal division, Hitachi aims at avoiding elementary mistakes such as getting into trouble by ignorance. However, the implication is that many international troubles relating to hardware, software of computer and LSI of semiconductor, etc. will occur in the future.

Oki Electric Co. aiso established a legal division in 1982, after the IBM Industrial Spy Incident. Oki aims especially at foreign law to prepare for the high-tech friction with the U.S.A. The legal division issued a small pamphlet, entitled "Legal Disputes in Trade between U.S. and Japan," and circulated it within the company to educate staff. Last April, Oki invited Mr. Joseph A. Doil who was a well-known lawyer (former Assistant Secretary of Navy under Carter Administration), to Oki U.S.A. as part-time managing director. "Trying to prevent friction by appointing legal personnel." (Mr. Hashimoto, President of Oki Electric Co.) Oki will attempt to promote and enforce its company constitution.

However, by being afraid of friction too much, if the company activities become too passive, it will lose everything. Mr. Tadayoshi Honma, Director of Legal Division in Mitsubishi, said, "The thing we are concerned most, is that technical staff will apply the breaks to the gathering of information activity by too much legal information and consultants provided. The company should be a forward-looking battle group which is not afraid of taking risks. Otherwise, the company cannot grow. We are only the supporting staff for it." They understand what their mission is, then they work for preventing a high-tech friction.

INCREASING FRICTION IN JAPAN

Regarding intellectual proprietary or intellectual property such as software for computer, a company stands on the defensive side as well as on the offensive side. In a word, by researching other company's property, the company creates better products. However, according to Japanese companies' countermeasures, there are so many offensive measures but few defensive ones. Most of the internationally recognized softwares are created by IBM or other American/European companies. Reasons why Japanese companies do not have defensive measures, are probably because Japan is still at the stage of imitating other company's products and because Japanese intellectual properties are protected by invisible barriers such as the Japanese language and Japanese culture.

However, there is no doubt that the friction relating to computer software and database in Japan, will increase in the near future. Incidents of copying game-software and stealing CAD software by Ni'igata Steel's ex-technical staff, are indications of this. The Copyright Council of the No. 7 Subcommittee, Database Study Group, in the Cultural Agency, has concluded in its interim report at the end of 1984, that the database should be protected by copyright.

In the high-information society, the database is given attention that it has the highest possibility for growth among intellectual property. The friction or trouble relating to database manufacturing sales, etc., will increase both in Japan and abroad. Under increasing high-tech friction, the company has to accumulate know-how of its defense countermeasures, such as clarifying the concept of intellectual property.